

July 1999

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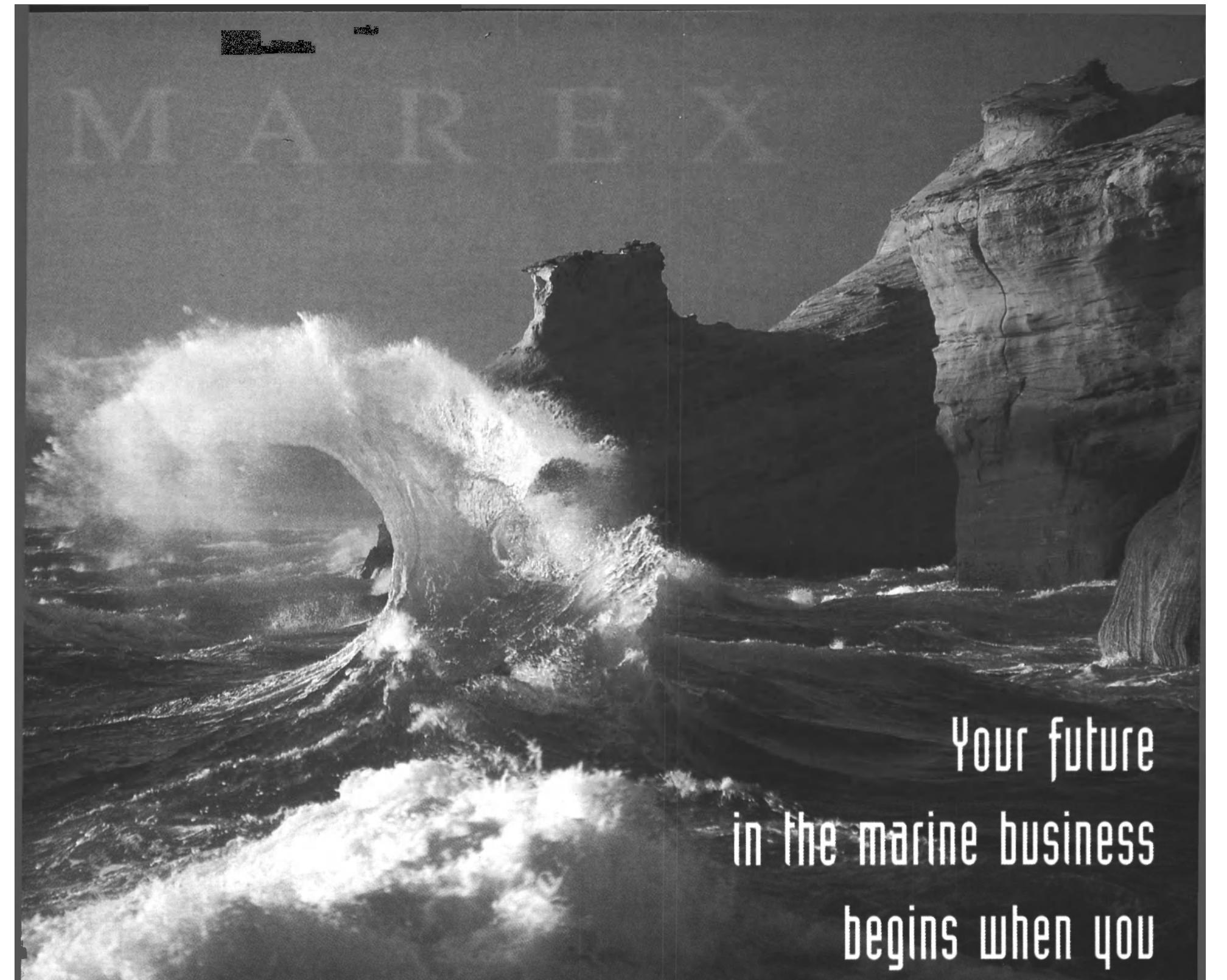
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**On the Cover:** Pictured is Bisso Towboat's new Cecilia B. Slatten, a 4,300-hp reverse Z-drive tractor tug powered by twin EMD 16-645-E6 diesel engines (each producing 2,150 hp @ 900 rpm). For the most updated technical specifications on marine diesel engines, please see the Marine Diesel Engine Guide, starting on page 33. For more details on the vessel, see Inland Insights on page 16.

### 8 On Tap

The performance of a Norwegian fjord ferry — the first to be fueled using LNG — will be closely monitored by industry insiders and environmentalists alike.— by David Tinsley

### 18 Cruise Control

With an anticipated annual investment of \$2.7 billion, the cruise industry will continue as the maritime market's shining star.

• **Cruise & Ferry Products & Services**, p. 22

### 33 Marine Diesel Engine Guide

Company-by-company, product-by-product technical guidebook to the world's marine diesel engines.

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MR/EN's Marine Diesel Engine Guide is available in an electronic version at:

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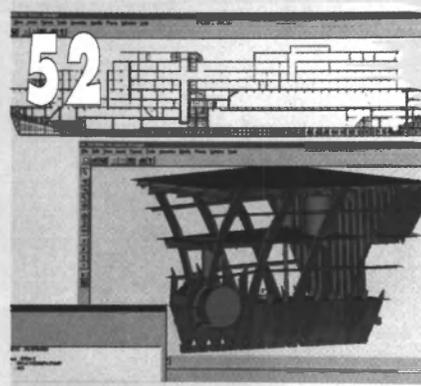
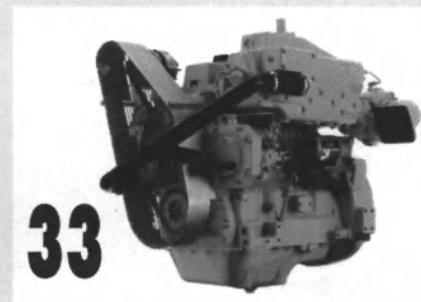
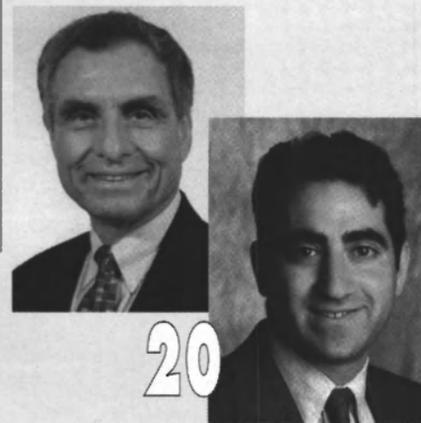
The entrance of Iridium, Globalstar and ICO promises to quicken an already lightening quick pace of shipboard communication evolution.

• **SatCom Products & Services Guide**, p. 50

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Advanced CAD/CAM/CAE applications are increasingly employed to make the process of designing, building and maintaining a fleet more efficient.

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## EDITOR'S NOTE

**E**xplosive growth in the cruise shipping sector has led to many interesting developments, particularly the diversion of new ship orders from traditional powerhouses in Europe to emerging players in the U.S. and Asia. While it would be foolhardy to proclaim a definitive shift in the balance of power — as European yards still hold a commanding lead over the rest of the world for the business of building cruise and ferry ships (see chart on page 29) — it is interesting to note the number of significant orders flowing to U.S. and Asian yards. While the final judgement will be reserved until final delivery, when overall cost and quality can be ascertained, this undoubtedly could be considered a watershed event in years to come. A host of new players have their foot wedged in the door to claim new, high-value cruise ship business, and it is a good bet that yards such as Ingalls Shipbuilding and Mitsubishi Heavy Industries (which recently won its first cruise ship order from Princess) will be reluctant to relinquish the momentum that they have earned.



While cruise shipping provides a high per-ship value and "glitz" factor to the traditionally understated maritime market, it only represents a very small part of the overall maritime business in a given year.

Perhaps more significant to the quickly evolving market are developments in the shipowning, shipbuilding and marine equipment supply companies, each of which has been drastically reshaped through merger and consolidation.

There are increasingly fewer choices for the builder of everything from a tugboat to a tanker, as well as the supplier of everything from bridge electronics to diesel engines. This is little "news" to industry watchers, but the point was starkly brought home during the recent NorShipping Exhibition, when the true breadth of equipment currently housed under the Vickers Plc banner (Ulstein, Kamewa, Aquamaster, Rauma, Brown Brothers, Michell, Bird Johnson) was fully realized. Similarly, as the business of shipowning continues its slow but steady journey towards corporatization, it would be reasonable to assume that as fleets become larger, they should start to incorporate similar outfitting characteristics, if for nothing else than for the sake of efficient maintenance.

*Greg R. Franthum*

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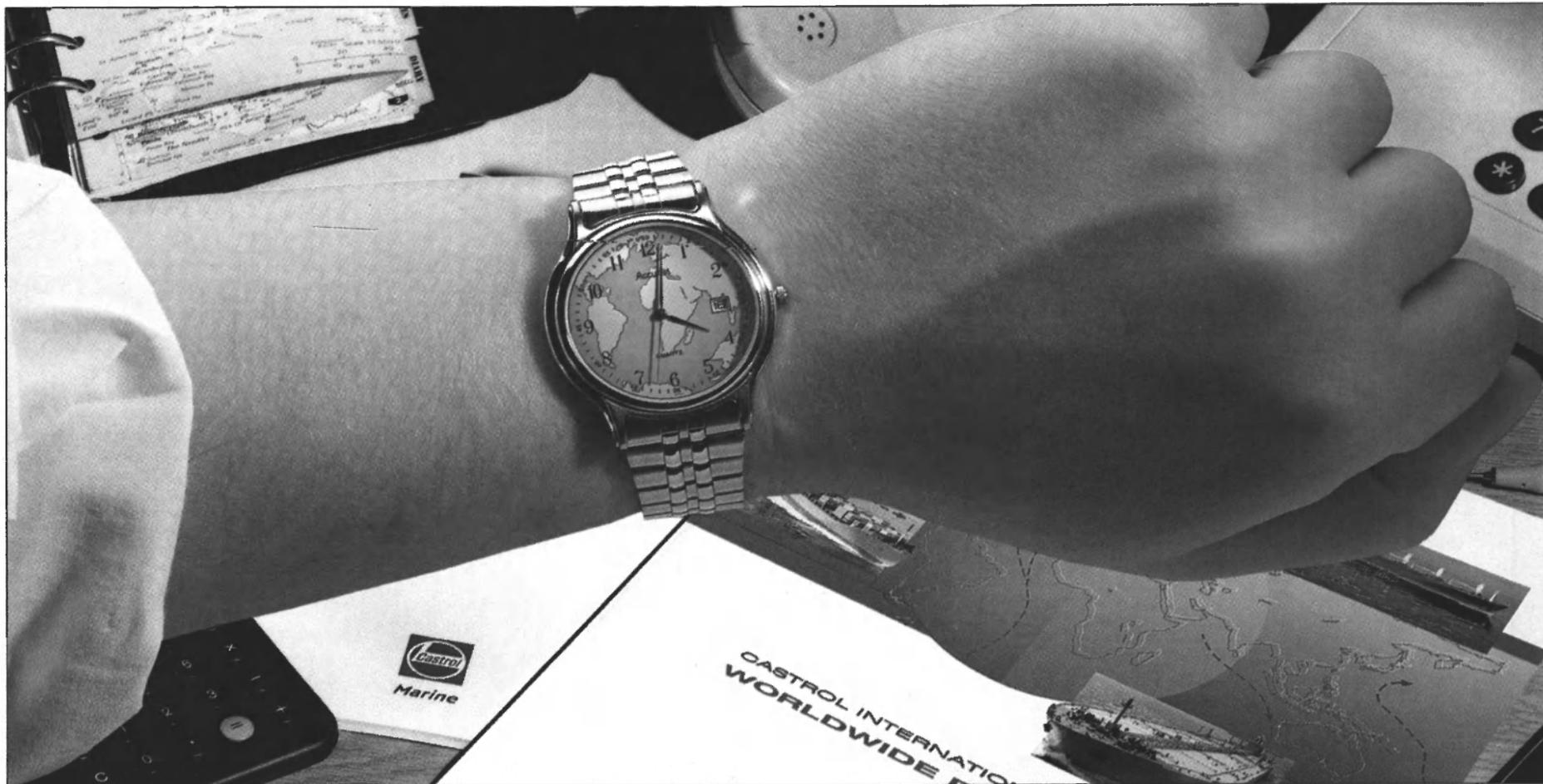
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by David Tinsley,  
technical editor

# Tapping LNG on the fjords

In the first application of its type in marine propulsion, a Norwegian fjord ferry is to use LNG (liquefied natural gas)-fueled engines as the prime movers for a gas-electric powering and drive system. While primarily an environmental initiative, the use of the 'clean' energy source also holds out the prospect of reduced engineering maintenance outgoings over the long-term.

Although Scandinavia remains in the vanguard of 'lean-burn' technology, the plant for the 312 ft. (95-m), double-ended RoRo passenger ferry for operation in the western county of More & Romsdal will be of Japanese origin. It is claimed that the Mitsubishi gas engines, burning LNG derived from North Sea oil production, will produce 90 percent less nitrogen oxide (NOx) emissions relative to a diesel plant of comparable output.

Certain local marine equipment suppliers, witnessing a Japanese success in their own backyard, are skeptical as to

the future scope for such installations. Certainly, there is a premium to be paid, and fundamental logistic considerations prevail as regards ensuring LNG bunkers supply.

However, others in the industry believe that Norway's vital coastal and fjord transportation infrastructure, married with the inevitable increase in local controls on atmospheric pollution from ferries and other shipping, will promote further investment along the lines of the More & Romsdal Fylkesbaater project. As in Sweden and Denmark, in particular, ferries have a very high environmental profile, due to constant operation within communities which have strong views on pollution matters. For the lightly populated Nordic countries, moreover, atmospheric pollution generated by shipping, particularly on a localized basis, is high relative to that produced by other activities.

For sure, the vessel's performance following scheduled delivery at the begin-

ning of next year will be closely followed by the short-sea sector and Nordic ferry industry as a whole. The surge in uptake of selective catalytic reduction (SCR) devices for diesel plant and investment in other measures such as direct water injection (DWI) are indicative of vessel operators' recognition of the need to respond to increasingly stringent local and national controls inspired by environmental issues. Gas engines have intrinsic merits with regard to emissions performance, without the need for secondary measures, and a gas-electric system as specified for the new ferry confers the operational and design flexibility and space-saving benefits otherwise seen with the diesel-electric mode.

The double-ender has been ordered from Langsten Slip & Baatbyggeri, well known for its disposition towards the more challenging newbuild schemes. She has been dimensioned for 96 cars and 300 passengers.



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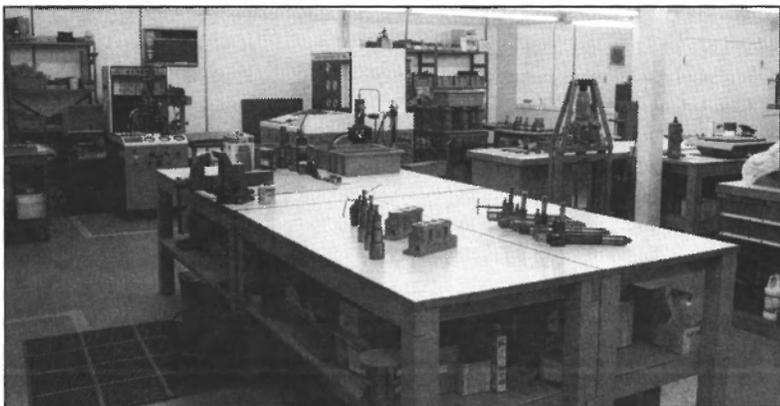
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Based in each case on a 12-cylinder Mitsubishi Vee engine driving a 650 kW generator, the four genset modules will be arranged on deck, feeding electrical energy to a pair of propulsion motors. The genset modules will be put together at the Spikkestad production plant of Norwegian company Diesel Power. It is anticipated that the vessel's regular service schedule, on a characteristically short fjord crossing, will require just two aggregates to be fired-up, leaving one engine as a standby, and a fourth under maintenance in a rolling program whereby machinery upkeep can be undertaken without prejudicing vessel availability.

### Niche know-how

Pivotal to the quantification of new oilfields and, increasingly, to the fuller exploitation of existing or marginal

accumulations, offshore seismic survey has become an intensely-competitive niche business in its own right. Performance levels set by the demands and expectations of the client industry have been driven still higher by the operators' need to achieve unprecedented productivity from costly vessels incorporating multi-streamer arrays and the most technologically advanced data handling capabilities.

The 1999 first-half has witnessed a considerable strengthening in the fleet purpose-designed for the task of seismic survey, undertaken in often hostile environmental conditions and in an ever-more demanding commercial market. The latest surge of investment has been dominated by Norwegian yards and equipment suppliers, underscoring the range and depth of the Norwegian maritime industrial infrastructure.

At a time when the shipbuilding industry's forward workload gives rise to immediate-term concerns over production continuity, the clutch of recent deliveries of new-generation seismic ships testifies to the reserves of design and build know-how and scope of indigenous equipment and machinery supply available on Norway's Atlantic fringe.

While the U.S. influence on the business is manifested in the commissioning of the 16-streamer Western Trident from Ulstein Verft, Norwegian-based operators PGS and Geco-Prakla have bolstered capacity with 20-streamer new-builds from the Langsten and Mjelle & Karlsen yards, respectively.

The designs reflect the trend in demand towards wider tows, bigger arrays and longer streamers in 3-D exploration work, and the requirement

for dense blanket coverage for the high-resolution 3-D market. These remarkable ships embody efficient hulls formed to accommodate the aft-deck concentration of the tools of the trade and to provide stable working platforms in the most rigorous sea conditions. They have been engineered for high maneuverability and for the minimum noise and vibration interference with the central role of data gathering.

The industry's ability to demonstrate the kind of innovation and technological capability which bears directly on front-line economics is evident in the fact that the cost of undertaking 3-D seismic survey has been progressively cut from some \$25,500 per sq. km in 1990 to around just \$2,000 per sq. km now. In addition, survey assignment time has typically been cut from about two years to barely two months or less over the

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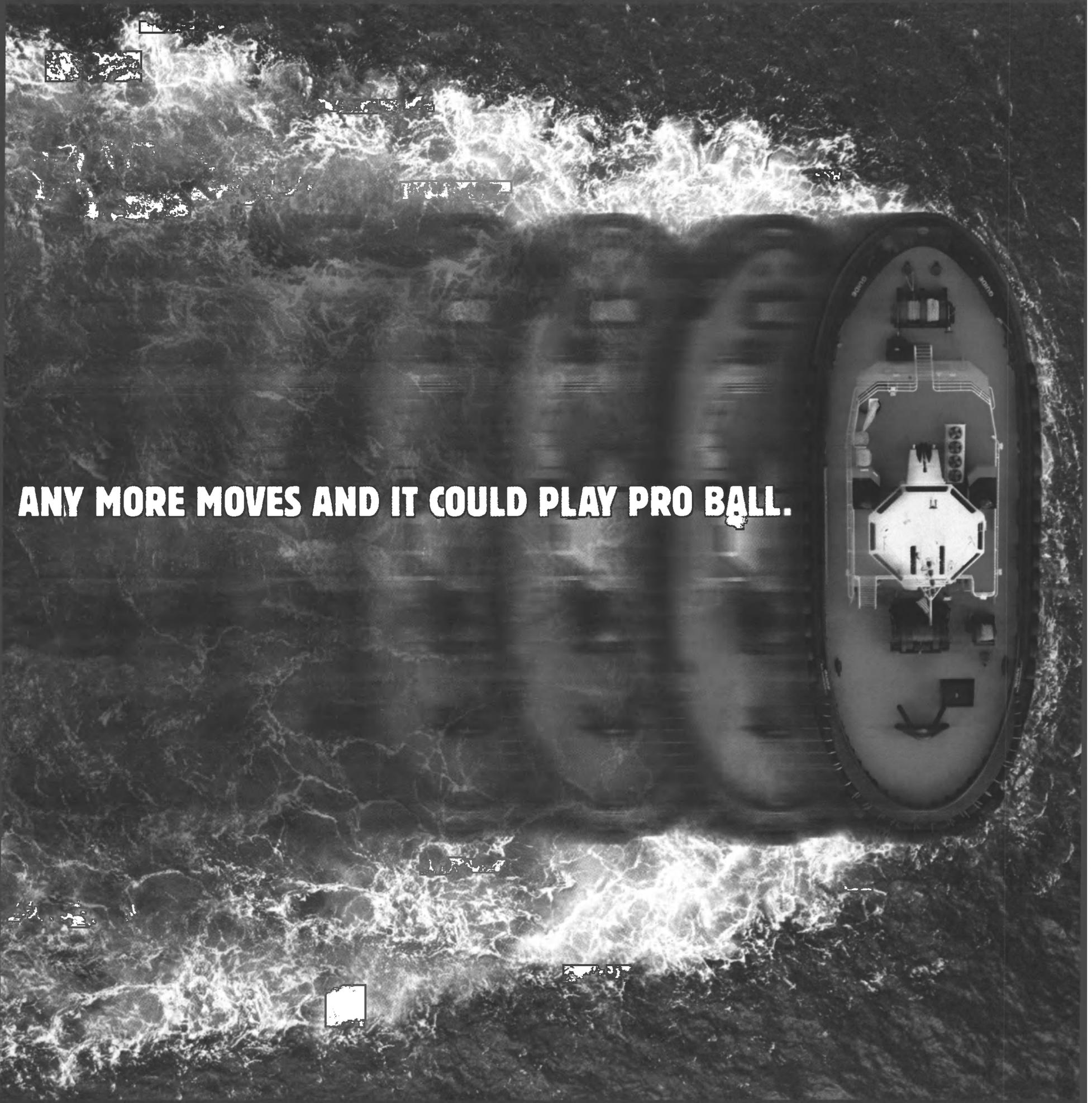
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## Investment in Design

same period.

While the delta-shaped Ramform design, home-grown in Norway and used by PGS for the sextet of Ramform Explorer-class vessels from the Langsten group, is a mark of innovation in the field, the recently-delivered Geco Eagle has also introduced a distinctive new configuration to a vital offshore

activity.

The 10,500-gt, diesel-electric Geco Eagle has become the flagship in the 27-strong fleet controlled by Geco-Prakla, the seismic operating unit of Schlumberger Oilfield Services. The distinguishing feature of the 312 ft. (95-m) vessel is the lateral extension of the main deck structure aft, providing the

requisite 'back-deck' width for the multi-streamer gear and associated equipment while ensuring a more hydrodynamically-efficient stern. The twin-skeg, relatively shallow underwater aft form has been designed to minimize noise, given the need for quality data obtainable from the survey hydrophones.

Constructed in Bergen by Mjellem & Karlsen, among the world's most prolific builders of survey vessels, Geco Eagle has an outfit of 16 streamer winches on the main deck aft, with provision for the tow to be increased to 20 streamers through deployment of lead-in winches either side of the gun deck.

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### FastShip Signs With NASSCO For Construction Of Fleet

Another step in a turnaround of commercial vessel building in the U.S. was reached last month, as FastShip announced that it has signed a Memorandum of Understanding with National Steel and Shipbuilding Company (NASSCO), a subsidiary of General Dynamics, for the building of the first generation high-speed vessels comprised of the FastShip trans-Atlantic transportation fleet.

Under the proposed agreement, NASSCO, designer and builder of new ships headquartered in San Diego, will construct four revolutionary vessels in the FastShip fleet. The agreement establishes a timeline to finalize a construction contract to include definitive pricing, delivery schedule and performance guarantees.

NASSCO has also agreed to consider a financing commitment to FastShip, Inc.

FastShip will employ a time-definitive seven-day, door-to-door North Atlantic transportation network — linking the middle of Europe to the middle of the U.S. Trial operations will begin during the second half of 2002, with the initiation of commercial operations planned for commencement in early 2003.

Powered by five marinized aero-derivative gas turbines, each turbine will drive one Kamewa water jet, delivering a total of 250 MW or 335,000-hp. This package will therefore enable the 860 ft. (262 m) vessels, carrying a 10,000-ton payload to complete the passage from Philadelphia to Cherbourg in less than four days at speeds up to 40 knots.

Circle 41 on Reader Service Card

### Tidewater Signs Agreement Of Intent

Tidewater, Inc. has signed an agreement of intent to acquire six newbuild vessels from Hvide Marine Incorporated, for an aggregate price of \$22 million. Closing, which is expected sometime this month, is subject to customary due diligence matters, including executing a definitive agreement and satisfactory inspections of the vessels by Tidewater.

## Investment in Design

# Sulzer RTA60C: Big Power For Fast-Type Ships

Wartsila NSD used the recent Nor-Shipping exhibition in Oslo as a launching pad for its latest offering to the marine world, the Sulzer RTA60C, an engine designed for faster type ship requiring power outputs up to 18,880 kW (25,680 bhp).

The RTA60C furthers the mandate to offer cleaner, more efficient power packages in a smaller space and less weight consuming manner. One indication of its compact dimensions is the fact that the six-cylinder version is just 7,620 mm long. Length has been minimized in similar ways to those that have been proven a success in the RTA48T and RTA58T engines. The fact that the cylinder covers each have just four holding-down studs further accounts for the compact arrangements, while simplifying manufacture.

The RTA60C has a 600-mm bore and 2,250 mm stroke, and boasts a mcr of 2,360 kW/cylinder (3,210 bhp/cylinder) at 114 rpm. It is available with five to eight cylinders, covering the power

range from 8,250 to 18,880 kW (11,200 to 25,680 bhp) at 91 to 114 rpm. This power and speed was designed for a wide range of "faster" ship applications, such as medium-sized containerships

(abt. 1,200 to 2,700 TEU), car carriers, RoRo vessels, reefers.

Aside from its operational attributes, the new engine is an important plank in Wartsila NSD's platform in that it was

designed with ease and economy of manufacture in mind. This involves an extensive cooperation with major licensees building Sulzer diesel engines and subcontractors as well. The engine maker incorporated many suggestions from shipowners and shipbuilders, with respect to installation and maintenance.



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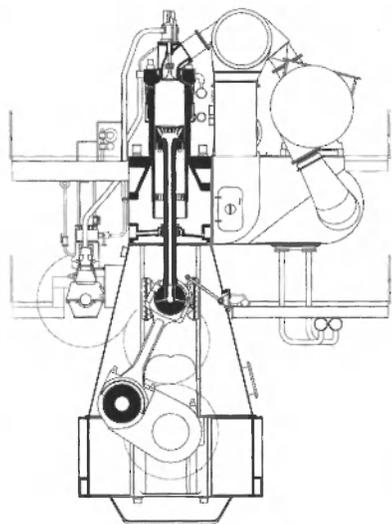
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#### Sulzer RTA60C Marine Diesel Engine Data



Bore .....	600 mm
Stroke .....	2,250 mm
Stroke/bore ratio .....	3.75
Power, R1 mcr .....	2,360 kW/cyl.
.....	3,210 bhp/cyl.
Speed range, R1-R3 .....	114-91 bar
Mean piston speed @ R1 .....	8.55 m/s
Cyl. Pressure (max) .....	155 bar
No. cylinders .....	5-8
Power range .....	8,250 to 18,880 kW
.....	11,200 to 25,680 bhp

#### Dimensions and Masses

Cyl.	L min	Net Mass
	Mm	tons
5 .....	6,580	290
6 .....	7,620	330
7 .....	8,660	375
8 .....	9,700	415

## Investment in Design

The RTA60C incorporates the latest advances designed to enhance engine performance and longevity, including low piston crown temperatures given by well-adapted jet-shaker cooling; cylinder liners with sufficient hard phase; and fully honed running surface. Piston ring performance is enhanced with the use of

anti-polishing rings at the top of the cylinder lines, a concept tested on existing RTA engines with reported good results. The anti-polishing ring has a slightly smaller bore than the cylinder liner so that it helps keep the top land of the piston clean. This stops deposits on the top land from doing any damage to

the liner running surface and its lubrication film.

The RTA60C takes advantage of the latest technologies in the Sulzer pipeline, specifically the RT-flex system that uses the Sulzer Common Rail system to give a fully electronically controlled engine that has no need of the

camshaft and its individual fuel pumps. The new engine is designed so that it can be efficiently modified to incorporate the RT-flex concept.

Circle 62 on Reader Service Card

## Alfa Laval Introduces Revolutionary Separation Unit



Premiering for the first time at Nor-Shipping 99 was the Alfa Laval Separation Unit (SU), designed for cleaning all types of oil. Alfa Laval, who claims that the SU's rather high separation efficiency, combined with impressively low installation and operating costs make it the most cost-efficient oil treatment system on the market.

With centrifugal separation as one of the company's core technologies, the development of the Separation Unit was aimed on achieving the highest possible separation efficiency by optimizing the bowl design of the separator.

A special test method was implemented by Alfa Laval Separation's Fluid Dynamics Group, confirming that extremely high and stable efficiencies are possible with the Separation Unit series. The tests also indicate that separators of competing makes provide much lower levels of efficiency.

Consisting of just five main elements: a separator, a block of ancillary components, a sludge removal kit, a control cabinet and a base — the Separation Unit is simplistic. Including six connections for oil, water, air and electricity, the Unit can be hooked up and switched on with ease.

With ship operators in mind, service intervals for the separator are considerably longer — up to 12,000 hours for the first overhaul service. This comes as a result of the new bowl design, combining high capacity with high efficiency. Prolonged service intervals mean that spare parts used for planned maintenance are lowered dramatically compared with existing models. According to Alfa Laval, this can cut operating costs by as much as 50 percent over a three-year period.

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## Inland Insights

# New Towboat Built on Old Hull

Stewart & Stevenson Services, Inc., based in Harvey, La., has delivered a towboat, Espiritu Paraguayo, to Asuncion, Paraguay to Navegacion Paraguaya Americana S.A., a company affiliated with the South American barge line ventures of Allen Mott.

This is the third towboat purchased by Mott from Stewart & Stevenson, and the fourth towboat powered by Electro-Motive Division of General Motors (EMD) engines by S&S for Mott and Mott's affiliates.

Espiritu Paraguayo was completed using the hull of Senator Eastland, previously owned by Brent Towing Co., Inc., Greenville, Miss., which burned in 1989 on the Arkansas River.

After the fire, the vessel was towed to Superior Boat Works, Inc., in Greenville, and the machinery and deckhouse was removed and the hull was painted and stored. In 1997, S&S purchased the hull, along with new rudders and propeller shafts, as well as the old propellers. S&S commissioned Design Associates, Inc., to do a powering study of the vessel, which concluded it could be rebuilt and repowered as a 5,400 hp towboat.

S&S subcontracted with Halter Marine, Inc., to do the detailed design and to repair the hull, then complete the boat in an "all new" condition. The hull was towed to Halter Gulf Repair in New Orleans, and drydocked. Audio gauge readings of the hull revealed the hull was in "like-new" condition. Gridcooler boxes were changed, and some added, and the channel coolers for the generators were lengthened.

Sea chests for the special firefighting equipment and watermaker were added. New, larger strut barrels were installed. All new bearings were installed in the rudder and flanking rudder trunks. New bearings were installed in the strut barrels and stern tubes, new Johnson Air Seal packing glands were installed and new Cooper split bearings were installed on the intermediate shafts.

Additionally, a new pair of Bollinger 102 x 98 in. stainless steel four-blade propellers, with 90 percent developed area ratio was installed. New rudders were installed, as were new Fernstrum gridcoolers, and the hull was sandblasted and painted. The hull was refloated and towed to Halter Marine, Inc., in Lockport, La.

When the hull arrived, the interior was prepared for some changes and the machinery was installed. A pair of Lufkin Model RHS 3020 reverse-reduction gears, with 3.75:1 ratios were installed, and then a pair of remanufac-

tured EMD 16-645EC turbocharged engines to produce 2,720 hp each at 800 rpm.

Finally, two Detroit Diesel 8V71N, 115 kW generator sets were installed.

After installation of the machinery and major piping, the deckhouses were installed on the hull, and outfitting began. An entirely new steering system was installed, with all new tillers, jockey bars, pins and hydraulic equipment designed by Skipper Hydraulics, Inc., of Harvey, La.

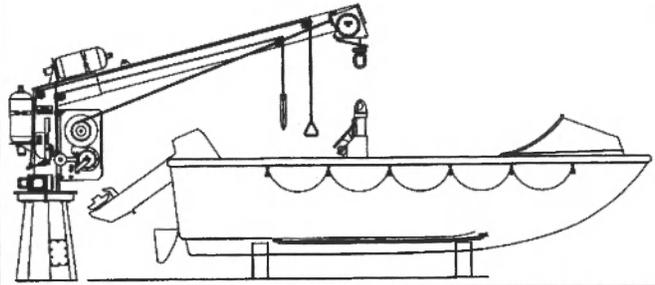


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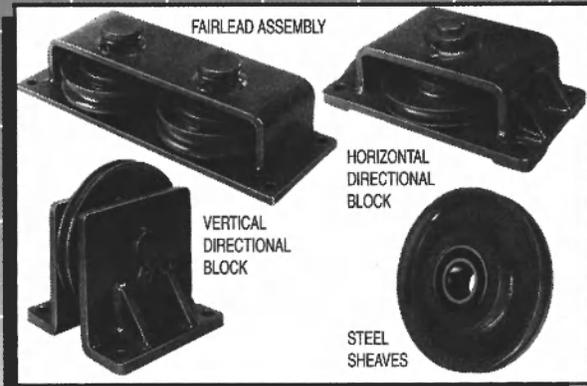
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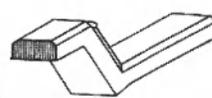
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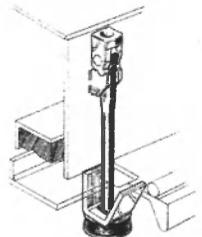
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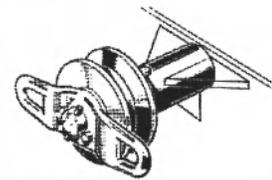


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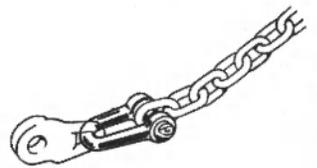
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## Inland Insights

A Detroit Diesel, 50kW, 4-71N powered generator, set in a stainless steel, quiet enclosure, was mounted on Korfund isolators atop the main deckhouse. This generator will be used when the vessel is standing by in unmarked portions of the South American rivers, where vessels do not run at night. Addi-

tionally, there is no 60-cycle shore power available there.

The vessel features several firefighting systems. An automatic CO2 flooding system for the engine room was installed. A dry chemical, portable, wheeled extinguisher was placed aboard, and standard engine room elec-

tric fire pumps were installed. An additional 25 hp firefighting pump was installed in the forward hold, which is powered by the 50 kW generator set and controlled from forward. Two 200 ft. fire hoses are mounted on the forward bulkhead of the main deckhouse. A 25 hp emergency bilge and salvage pump is

also installed in the forward hold.

A particularly high eye level (47 ft.) was designed, because the pilothouse is four decks above the main deck. There are no low bridges in the area in which the vessel will operate.

The vessel operated on sea trial with minimum vibration and excellent handling characteristics. It was readied for sea and floated into a partially submersible dock ship and proceeded for Argentina four days after sea trials.

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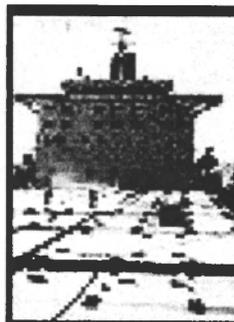
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Breadth:	38.5 ft. (11.7 m)
Depth:	10.7 ft. (3.2 m)
Fuel:	115,000 gal.
Potable Water:	18,000 gal.
Lube Oil:	850 gal.
Gear Oil:	135 gal.
Quarters:	15 crew in 8 staterooms
Guest Quarters:	2 Person with private bath
Main Engines:	EMD 16-645 E4C
Generators:	(2) at 99 kW each
Generators Driven By:	8V71 Detroit Diesel
Engine Monitoring Equipment:	Point System (EMI)
Engine Coolers:	Fernstrum Gridcoolers
Reserve/Reduction Gears:	Lufkin
Propellers:	102 in. Kahlenberg
Steering System:	Skipper Hydraulics
Hull Construction:	Steel
Fuel Capacity:	Approx. 100,000 gal.
Steering Rudders:	Two
Flanking Rudders:	Four
VHF:	Standard GX
SSB:	SEA 535
Capstan:	McElroy; Model#MCR-12-7.53N
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### On the Cover

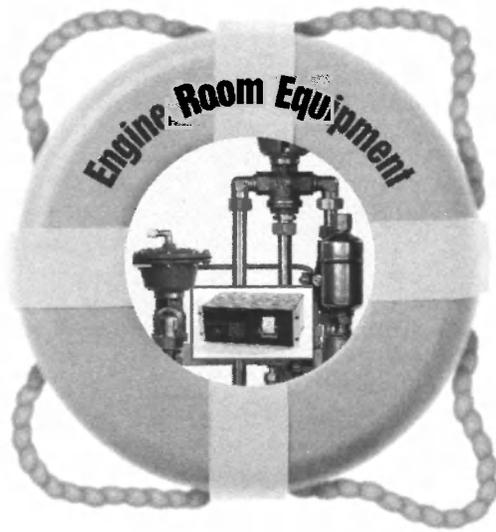
#### Bisso Announces Latest Mississippi Fleet Addition

Bisso Towboat Co. Inc. announced a new addition to its fleet of Mississippi River ship-assist tugboats. The tractor tug, Cecilia B. Slatten, was christened on May 13, 1999 during a reception at the Delta Queen Steamboat Terminal.

On May 17 the tractor tug began servicing the Mississippi River. The 4,300 hp reverse Z-drive tractor tug has three staterooms with berths for six crewmembers, including sound and heat proof insulation in all accommodation areas to reduce noise, and two central air/heat units and a pilot house interior. The pilot house is equipped with 40 windows giving the captain a 360-degree range of visibility.

### Main Particulars

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Generator sets:	(2) 75 kW Lima
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# The Good Life



Cruise shipping unprecedented bull run is likely to continue, with annual investment of \$2.4 to \$2.7 billion anticipated. — by David Tinsley

With the buoyancy in newbuild business witnessed so far this year, the cruise ship orderbook stands at an all-time high of some 48 vessels. Erring on the conservative side, analyst **Peter Wild** of the U.K.-based consultancy G P Wild (International) calculates that the record workload constitutes 3.2 million-gt of ocean-going newbuildings worth around \$14.7 billion.

Further expenditure amounting to \$6 billion-plus is promised in the near-term on the basis of a raft of options and advanced negotiations and tenders.

The aggregate fleet investment offers the prospect of a net capacity increase not far short of the 77,500 lower berths encapsulated in the vessels under construction and on order, while offtake through scrapping is likely to be on a limited scale in the immediate term. In a presentation to the recent Cruise+Ferry Conference in London, Wild put the current level of investment into perspective with the observation that "The general pattern over the last decade has been for the number of outstanding contracts to be around 30."

The anticipated productivity of the

ships under build and still to be laid down is 4.5-million passengers per annum, assuming an average cruise duration of six days and an operating profile based on 350-days per year.

The domination of the business by a very small number of players is highlighted by the fact that 85-percent of current newbuild tonnage has been contracted from the four leading yards in the field, and that 64-percent is to the account of the top three cruise groups.

"It is generally accepted that demand in the cruise market is supply-driven, and the concentration of power in the hands of a few major operating groups can only enhance this factor," suggested Wild.

Carnival, the Royal Caribbean group and P&O together wield the greatest influence. The scale economies encapsulated in those companies' various newbuild initiatives is such that the aggregate share of industry investment is less than that of market share by gross tonnage and berth capacity.

The increasing effectiveness of the Alstom group company Chantiers de l'Atlantique, in the face of illustrious

European competition, new successes by Far Eastern builders in what has long been regarded as a European province of construction, and the emergence of a U.S. cruise vessel building dimension, make for a dynamic supply-side scenario.

Wild's statistics, though, give a measure of the European profile in the market, whereby Fincantieri, Chantiers de l'Atlantique, Kvaerner Masa-Yards and Meyer Werft have been entrusted with 37 of the 48 vessels in hand.

While contracts in force, plus options and definite projects give a fairly clear view of the newbuild path to 2003/2004, the indications are that the sector will continue to generate growth in high-value shipbuilding projects through the next decade. On the basis of current trends, Wild estimated that the industry might be expected to place orders for a total equivalent of around 12,000-12,500 lower berths per annum over the five years from 2004 to 2009.

By extrapolating the average cost per berth from current fleet development expenditure, the anticipated future flow of orders would constitute a minimum annual investment of \$2.4-2.7 billion, amounting to \$12-13.5 billion in the 2004-2009 period. "These figures are conservative and may well be exceeded," noted Peter Wild.

Carnival, Royal Caribbean and P&O subsidiary Princess Cruises together account for 70-percent of the North American cruise market, and are likely to maintain their dominance, according to **Per Regnarsson**, vice president of Moody's Investors Service. A favorable outlook for demand coupled with growth potential in North America, Europe and also Asia provided the backdrop to current fleet developments, he confirmed.

New entrants to the business and the ongoing enlargement of capacity impacts on price competition, industry yield and operators' margins. However, the pattern of industry growth and market penetration offsets the various pressures so that the top players continue to finance expansion, considered Regnarsson, who raised the question "Will smaller operators and newcomers survive in the longer term, and for how long?"

Regnarsson is Moody's leading analyst in Europe for the shipping industry, rating cruise ship and passenger ferry undertakings in addition to owners and operators in other fields. Influences on future ratings in the cruising domain would include a slowdown in the U.S. economy, a closer match between capacity and demand growth, price competition, and levels of debt-financed fleet expansion.

Addressing the Cruise+Ferry Confer-

ence gathering at London Olympia, Fincantieri's senior vice president, **Giorgio Cossutti** said that 1998 was perceived in many circles as "a year of records" in the cruise ship sector.

A total of 12 vessels worth nearly \$3 billion were commissioned into service, and fleet rejuvenation and expansion among leading operators had brought orders for 18 newbuilds with an overall capacity in excess of 33,000 berths. The contract flow took place against a backdrop of market development, whereby cruiseship passenger numbers grew by 8.6-percent, with peaks of 20-percent in the Mediterranean region.

Fincantieri's well-documented contribution to the industry's advance last year had included the deliveries of the seminal vessels Grand Princess, Carnival Destiny and Disney Magic. "Over the last 10 years, cruise operators have updated and reinvented this sector through efficient facilities, entertainment alternatives and new itineraries, in order to successfully compete with land-based holidays," noted Cossutti, who linked society's increasing value of quality leisure time to the seemingly inexorable growth in the cruise business.

As a capacity-driven market, demand is inextricably allied to the investment momentum, and with perceptions of quality and affordability.

It is also related to the industry's ability to demonstrate innovation in ship design and onboard facilities, to continuously enlarge the range of destinations and routes, and enhance shoreside logistics.

Although passenger numbers show year-on-year compound growth, competition is intense and passenger expectations are growing all the time.

In this environment, affirmed Cossutti, shipyards have to ensure that the product is in every respect tailored to the shipowners' core commercial requirement: to ensure that the vessel and the vacation fully meet client expectations as to comfort, enjoyment, and quality, while ensuring the requisite maximum safety.

He felt that European shipbuilders' would concentrate their efforts in three main categories, namely 'mega' ships in excess of 100,000-gt, incorporating relatively high speeds to enable a wider operating area to be covered, Panamax vessels of around 80,000/90,000-gt, and ships below 50,000-gt aimed at the luxury end of the market.

Cossutti pointedly observed that, "As a shipbuilder, it causes me some concern, as it does my European colleagues, that all the efforts we have made so far to improve competitiveness and create successful products, could be damaged by the devaluation of the currencies of our Far East competitors..."

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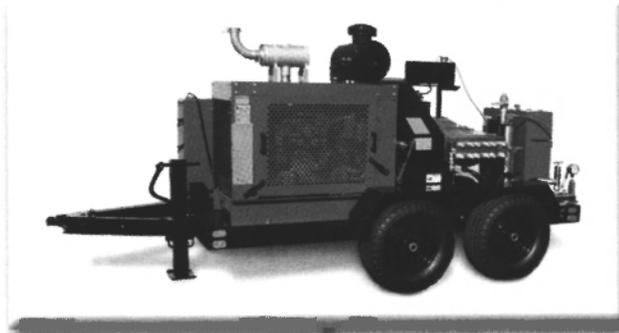


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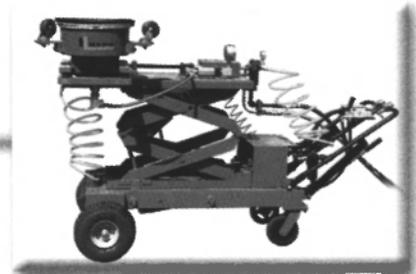
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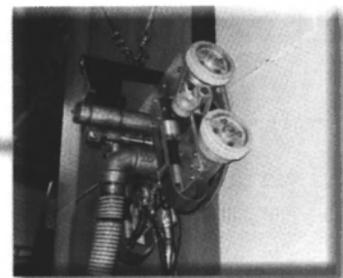
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# Melding The Old With The New

It's a timeless piece of history that is the newest deal going on in the cruise ship industry — the deal between the Delta Queen Steamboat Co. and

Atlantic Marine, which calls for the building of two U.S. Coastal flag ships inspired by the former Fall River Line Vessels which ran from 1847 to 1937.

By Regina P. Ciardiello, assistant editor

It was the age in which water transportation was the only mode of distance

travel. Henry Ford and the Wright Brothers had not yet become household names and the horse and carriage reigned as the only means of getting to and fro. Aristocracy held court on ships that sailed the high seas — namely the Fall River Line, which ran from New York to New England. Inspired yet? Executives at Delta Queen were — so much that they decided to model their current project after the famed line.

The paddles began rolling about a year ago at Delta Queen, when visions of the idea were first discussed between **Philip Calian**, president and CEO, American Classic Voyages (Delta Queen's parent company); and **Scott Young**, Delta Queen's president and COO.

"Phil and I talked about ways in which we could expand the company," said Young. "When we realized that the cost to design a historic vessel would remain the same, we decided to go that way."

"We thought about how we could further our marketing and product expertise," Calian said. "The Delta Queen project both meets the needs of the market in a cost-effective manner and plays off American history and culture."

Young and his team at Delta Queen spent the next few months working with the Marine Museum in Fall River, Mass., examining photos and drawings of the steamers on which the new Delta Queen is based.

"We looked at the various river steamers so that we could come as close as we could in designing a historic vessel with modern amenities," Young added.

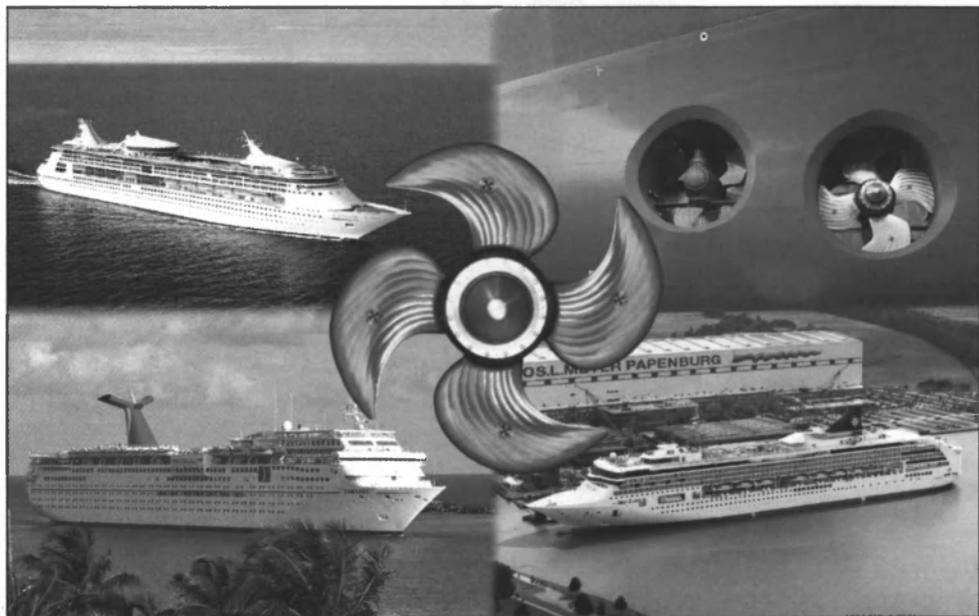
With a design and itinerary ideas in place, Delta Queen began its quest for history in the making on May 7, 1999 — with the naming of Jacksonville, Fl.-based Atlantic Marine as the builder of the first two 300-ft. (91.4 m), 226-passenger vessels at a base price of \$30 million each, with launchings scheduled in the spring and summer of 2001.

With the bidding process commencing when 16 invitations were sent out by

Facets) of change



From top, **Philip C. Calian**, president and CEO of AMCV; **Scott Young**, executive vice president, AMCV; and **Edward P. Doherty**, president, Atlantic Marine, Inc. have helped to bolster cruise vessel new-building in the U.S.



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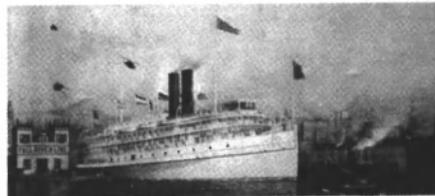
## Cruise & Ferry Shipping Report

### Main Particulars

Flag	U.S.
Length	300 ft. (91.4 m)
Beam	50 ft. (15.2 m)
Draft	12.5 ft. (3.8 m)
Height (from waterline to top of pilot house)	67.5 ft. (20.5 m)
Gross tonnage	1,580 (2,850 tons displacement)
Engine	Diesel
Propulsion	Twin Z-drives, bowthruster
Speed	13 knots



Delta Queen Steamboat Co.'s new line blends historic ambiance with modern amenities — the first is due in spring 2001.



One of the historic vessels of the Fall River Line. (Photo courtesy of The Marine Museum at Fall River, Inc.)



Passengers will enjoy breathtaking views of the coastal scenery while dining in an atmosphere of historic elegance.

Delta Queen, Atlantic was hand-picked from a pool of nine finalists, and according to the company's president, **Edward P. Doherty**, is very excited to have been selected for a project that is "a step in the right direction in the developing market for smaller cruise ships."

"The demand for smaller cruise ships is on the increase," Doherty said. "With this project we saw the opportunity to progress into this market."

Doherty added that steel for the first vessel is expected to be cut this August, once the vessels' detailed construction drawings are complete.

Operating as inland and coastal passenger vessels in both domestic and foreign waters, developed itineraries include round-trip routes on the Eastern Seaboard to Halifax, Nova Scotia and New York City; Juneau, Alaska; Seattle and Portland, Ore. on the Pacific Northwest; and San Francisco on the West Coast.

### Where the 19th Century Meets the New Millennium

Delta Queen Coastal Cruises, (a wholly-owned operating subsidiary of Delta Queen Steamboat Co.) houses the three remaining original steam paddlewheelers with overnight staterooms — namely the Delta Queen, the New Orleans-based company's own historic landmark. The additional vessels, Mississippi Queen and American Queen (the world's largest steamboat) still offer three- to 14-day itineraries on various inland waterways throughout the Old South.

Established in 1890, the company is aiming to redesign the new vessels with a combination that is few and far between — the joining of old world society inside, boasting modern mechanical and engineering aspects. To fully replicate this motif, Delta Queen has hired the naval architectural firm of Seattle-based Guido Perla & Associates. Headed by project manager, **Dave Pasciuti**, the design team's goal (according to Pasciuti), was to "blend old-world style with new technology for passenger safety and comfort."

"It is a vessel that will give passengers a turn-of-the-century feel and at the

(Continued on page 27)

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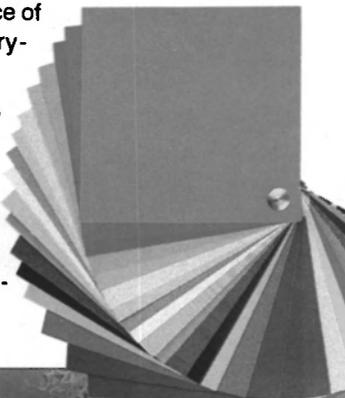
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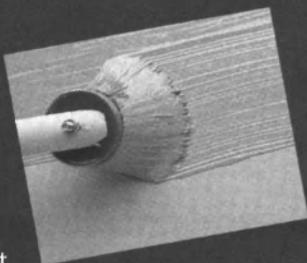
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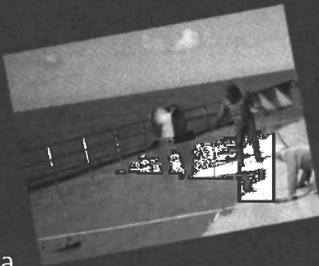
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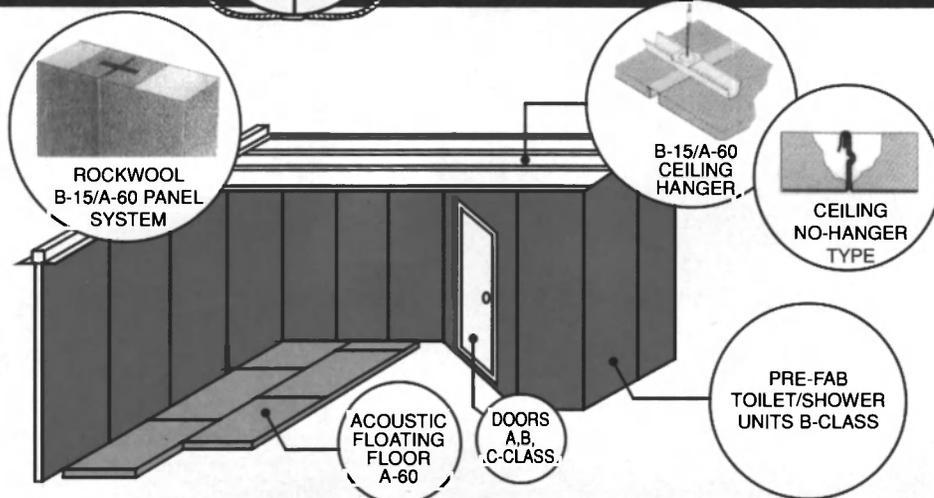
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**Thordon Launches Web Site**

Thordon Bearings Inc. launched its web-site to provide information on its products and services. Visitors of the site can browse through Thordon's marine, off-shore, hydro, and industrial applications. Visitors can also obtain technical and sizing information, and locate the company's worldwide distributors. The site can be accessed by logging on:

<http://www.thordonbearings.com>

In recent news, Thordon has been upgraded from ISO 9002 to ISO 9001 certification. The company expresses a strong desire to achieve consistent quality designs and systems for ships, offshore oil, hydroelectric power plants, pumps, and other applications.

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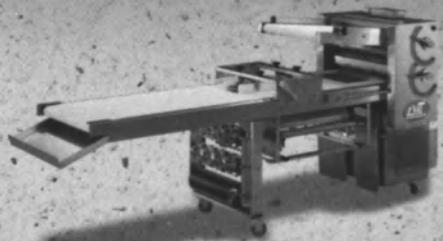
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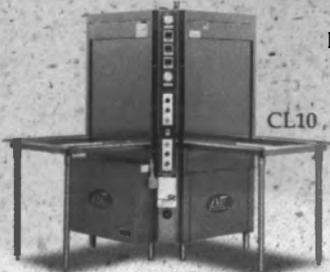
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Maritime Reporter/Engineering News

## Norwegian Cruise Line Goes To Great Lengths

Miami-based Norwegian Cruise Line has extended its fleet with the debut of 848 ft. (258.4 m) newbuild M/S Norwegian Sky, and has also lengthened its existing M/S Norwegian Majesty.

The 2,002-passenger, 78,000-ton vessel is set for introduction next month. "Stretching" of the Norwegian Majesty occurred this past January through April at Germany's Meyer Werft shipyard. A 100 ft. (30 m) midsection was inserted into the vessel, raising passenger capacity by 40 percent. With an additional 202 staterooms added on from the "stretch," the liner will offer seven-day cruises from Boston to Bermuda through October 1999.

## Disney Wonder Sails For First Port Of Call

Disney Wonder, the second ship to set sail for the Disney Cruise Line sailed for the first time this month to the Port of

Southampton upon departure from its Italian shipyard. The Trans-Atlantic crossing — a first for Disney, will mark the official launching of the ship's inaugural celebration before crossing to its homeport in Port Canaveral, Fla.

Similar to its sister ship Disney Magic, Wonder, which will enter service on August 15 of this year, has been purpose built and features rotation dining, Broadway-style entertainment and staterooms that are 25 percent larger than the norm.

## EBDG Performs With Flair For American Safari Cruises

Known for its creativity within the passenger vessel industry, Elliott Bay Design Group has applied its handiwork on projects for two vessels purchased by American Safari Cruises.

The 120 ft. (36.6 m) Obsession, (renamed Safari Quest); and the 105 ft. (32 m) yacht, Netanya, (now Safari Spirit), have undergone extensive refurbishments in preparation for high-season.

Elliott Bay prepared a contract design and production engineering assistance for Safari Quest, as well as lengthening aft its bridge deck to make room for four new staterooms — increasing passenger capacity from 14 to 22.

Work included installation of a new aluminum house structure, allowing for two new guest quarters and an observation lounge. A telescoping deck crane was also implemented.

Circle 27 on Reader Service Card

## Stretch Ceilings Displays at London's Cruise+Ferry

After introducing its innovative deckhead system last year, Stretch Ceilings, suppliers of Barrisol Stretch Ceilings, displayed its new wares at London's Cruise+Ferry Exhibition in May. The lightweight, titanium-based vinyl membranes weigh a mere 180 gms. per sq. m and have a tensioned membrane that is self-supporting up to 60 sq. m. Able to accommodate any required apertures for services or lighting, the maintenance-free system forms an impermeable barrier containing any water leaks that would cause costly damage. Available in various colors and finishes, and approved by Lloyd's Register, Bureau Veritas and the U.K. Maritime and Coast Guard Agency, Barrisol Stretch Ceilings are compliant with IMO resolutions A653 (16), spread of flame, and MSC 61 (67) smoke and toxicity.



Circle 26 on Reader Service Card

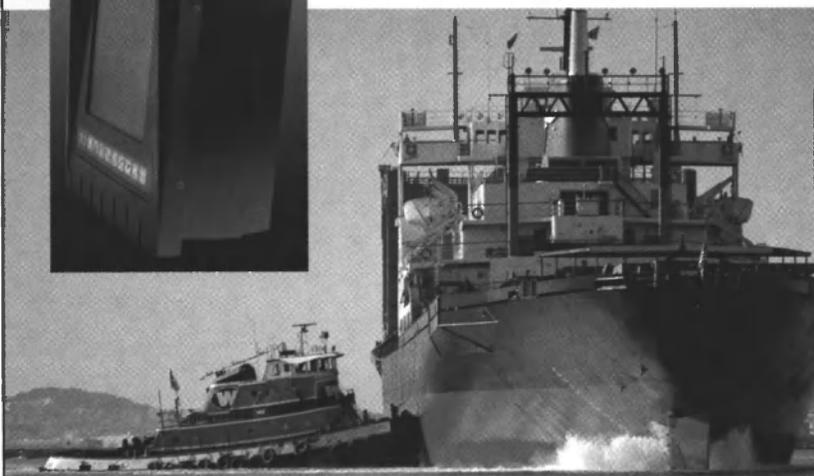
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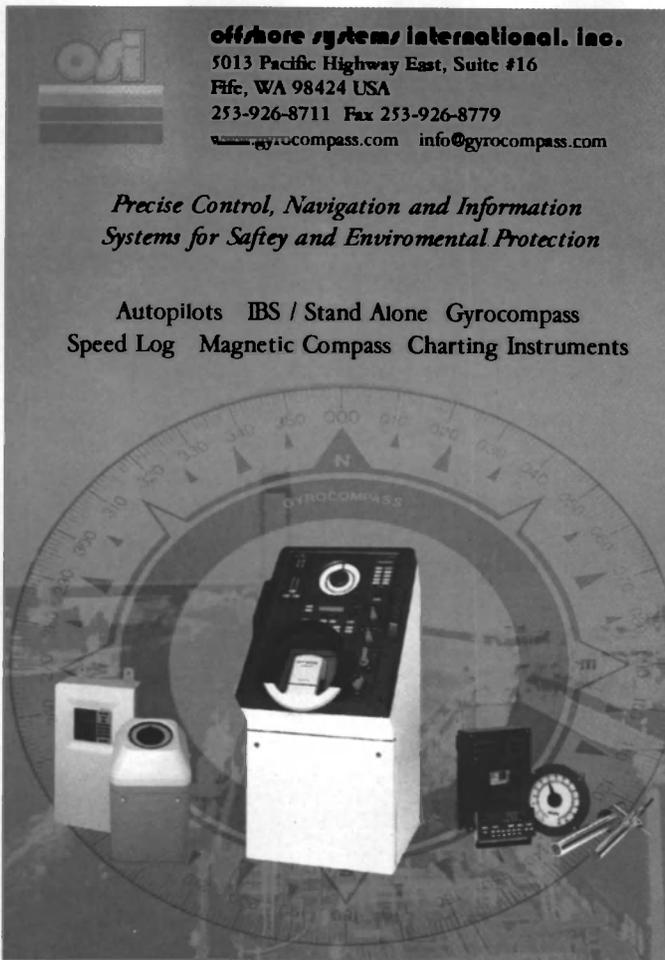
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### Sunglasses For Royal Princess

Solar Solve Marine's newest product, 'Sunglasses for Ships,' were installed on the Royal Princess for a recent cruise down the Amazon. The solar roller screens can be beneficial to the vessel staff by reducing glare and improving visibility, especially in very hot equatorial climates.

Circle 21 on Reader Service Card

### Atlantic Marine Completes Speedy Refurbishment For Royal Caribbean

In only nine days, Atlantic Marine completed repairs, hull cleaning, miscellaneous inspections and painting on Royal Caribbean's Sovereign of the Seas while at Atlantic's Alabama Drydock. Specific work involved the prefabrication of a stern thruster hull module for an owner-furnished stern thruster unit. The assembly was implemented into the hull along with the proper operational equipment, system piping and mechanical space with deck access.

The Sovereign was not Atlantic's usual drydock project. In comparison to its sister vessels, Legend of the Seas and Splendour of the Seas, Sovereign is designed with narrower box shaped keels joining a shaped bottom with a different thruster location.

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Circle 287 on Reader Service Card



## Cruise & Ferry Shipping Report

(Continued from page 21)

same time will include all the modern amenities and safety features of today's cruise vessels," Pasciuti added.

Combining stately New England Federal and nautical decor, interior design firm Andrea Piacentini Design will recreate the designs of the era allowing passengers to feel as though they are indeed aboard the original Fall River steamers.

The apex of the vessel's accommodations are the Outside Owner's Suites that feature a sofa bed, game table and a 180-degree view of coastal scenery via panoramic windows.

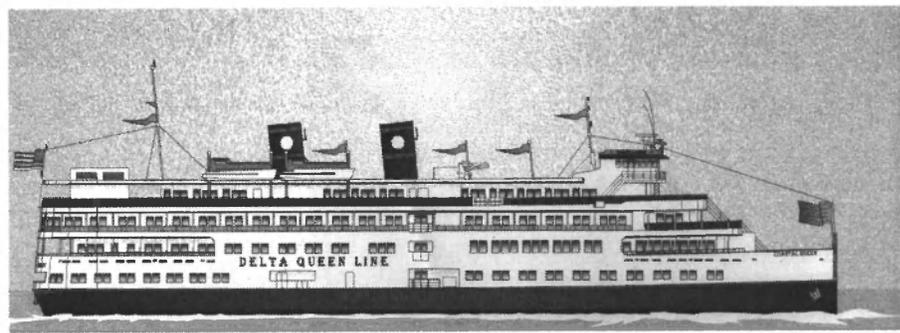
The jewel in the Delta Queen's crown is the 2,400 sq. ft. dining room complete with tasteful artwork and exceptional architectural and interior design.

According to Young, Delta Queen hopes to expand its entire historic fleet to approximately five to seven vessels. With options already promised to Atlantic Marine for a third vessel, the

company is well on its way to achieving its goal.

"Given their strong reputation in the shipbuilding business," Young said. "I think Atlantic will be an excellent partner in this current venture."

Circle 23 on Reader Service Card



### Superstar Virgo Departs Meyer Werff's Dock



Following extensive dock trials, the 76,880-gt cruise vessel, Superstar Virgo left the covered building dock of Papenburg, Germany's Meyer Werff Shipyard. Built for Asian-based shipping company Star Cruises, the ship was towed out to a fitting-quay to complete the remainder of its interior design.

Measuring, 879 ft. (268 m), with a capacity of 2,800 passengers, Virgo is sistership to Asian-operated Superstar Leo delivered in 1998. A diesel-electric propulsion plant will enable the vessel to travel at a speed of 25 knots.

Circle 24 on Reader Service Card

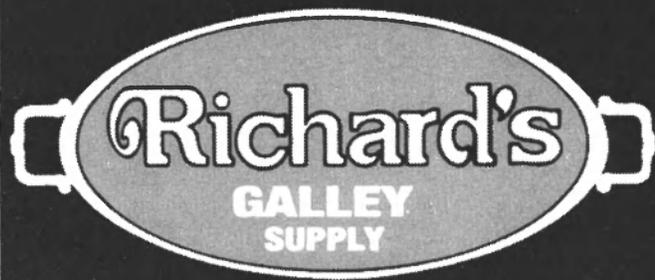
### Complete Shipboard Management Company Debuts

Tri-Meridian Cruise Services, Limited has made its mark in the industry as the first complete shipboard management company in the world. Created as the result of the Triton Cruise Services and Meridian Ship Managers merger, the service will provide ship owners and charterers with the convenience of dealing with one company to both manage and operate their vessels.

Circle 25 on Reader Service Card

July, 1999

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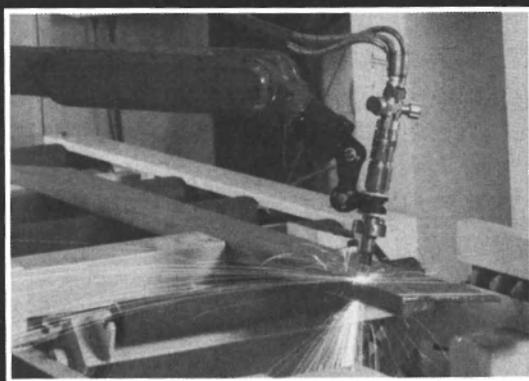
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## Med Ferry Operator and Korean Shipyard Announce Cruise Ferry Deal

A Mediterranean Ferry Operator and a S. Korean shipyard — What could these two establishments possibly have in common? Indeed, they do share a similar situation in that they both have never been involved with the cruise industry — until now. Moby Lines, the Mediterranean ferry operator leg of Italian-based Onorato Group has expanded its offerings with its recent order for a pair of fast conventional cruise ferries with Daewoo Industries of South Korea.

The closing and final decisions on this deal were sealed on Wednesday, June 2 by **Young Kyun Shin**, chairman Daewoo Industries and **Vincenzo Onorato**, chairman and owner of the Onorato Group. "These two vessels are of paramount importance for Moby Lines being

a part of a development plan foreseeing expansion of both the network of routes served and of the fleet," said Mr. Onorato.

Both of the cruise ferries, Moby Wonder and Moby Freedom — the largest passenger ferries to be ordered by a South Korean shipyard — will be constructed by world-wide industrial conglomerate Daewoo at the company's Koje Island situated Okpo Shipyard. Delivery is scheduled for Spring 2001 for short runs along the Mediterranean.

"To us this is a very important order," said Mr. Kyun Shin. "It in fact marks the entrance of Daewoo Heavy Industries in the luxury passenger vessel field which we are keen to further develop in the future." Fitted with more than 300 cab-

ins distributed throughout two decks (a separate deck will consist of cruise-style public rooms), the newbuilds will transport 2,000 passengers and 700 cars at a service speed of 29 knots. Main particulars are 587 x 89 ft (179 x 27 m) with a 23 ft. (7 m) draft. The 5,500-dwt twin ferries are equipped to carry approximately 2,000 lane meter of RoRo cargoes. The owner of 16 ferries, Moby Lines operate services linking the Italian mainland to nearby coastal islands of Sardinia, Corsica and Elba, as well as the supply of port towage services in 10 Italian ports. With a 50-member fleet, family owned Onorato Group is known for its specialization in the ferry trades and towage, salvage and offshore services.

## Unitor Augments Cruise-Related Product Range

Unitor Cruise Service, provider of product packages specifically designed for the cruise industry has introduced a new concept adding to its already vast selection.

The new concept combines Unitor's standardized product range of more than 10,000 items with a selection of new products and services specifically required by cruise vessels. The new lines encompass an extended selection of cruise chemicals, a new expanded gas cylinder offer that incorporates fuel gases, leisure gases and medical gases, and a new range of swimming pool and spa products. Unitor also offers cruise operators a complete ship-board medical service from its Miami operation.

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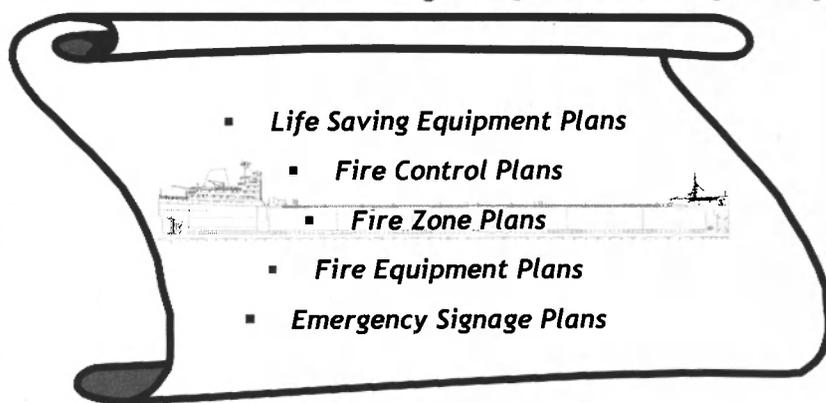
## World Orderbook Of Cruise & Ferries

Ship Name	Shipbuilder	Ship Type	GT	Delivery Date
Radiance of the Seas	Meyer Werft	Passenger Cruise	85,000	2001
Costa Atlantica	Kvaerner Masa Yards	Passenger Cruise	84,000	2000
Carnival Victory	Fincantieri	Passenger Cruise	101,672	2000
Ocean Princess	Fincantieri	Passenger Cruise	77,441	1999
Carnival Triumph	Fincantieri	Passenger Cruise	101,672	1999
Carnival Glory	Fincantieri	Passenger Cruise	101,672	2003
Carnival Conquest	Fincantieri	Passenger Cruise	101,672	2002
Fincantieri 6051	Fincantieri	Passenger Cruise	108,806	2001
Fincantieri 6050	Fincantieri	Passenger Cruise	108,806	2001
Amsterdam	Fincantieri	Passenger Cruise	61,000	2000
Zaandam	Fincantieri	Passenger Cruise	62,000	2000
Europa	Kvaerner Masa Yards	Passenger Cruise	28,600	1999
Disney Wonder	Fincantieri	Passenger Cruise	83,308	1999
Ocean Home	MEKAP	Passenger Cruise	12,000	1999
Superstar Libra	Meyer Werft	Passenger Cruise	85,000	2001
Aurora	Meyer Werft	Passenger Cruise	76,000	2001
Superstar Virgo	Meyer Werft	Passenger Cruise	73,300	1999
Norwegian Sky	Bremer Vulkan Werft	Passenger Cruise	80,000	1999
Blohm & Voss 962	Blohm-Voss	Passenger Cruise	24,500	2001
Blohm & Voss 961	Blohm-Voss	Passenger Cruise	24,500	2000
Regent Sky	Stocznia Gdanska	Passenger Cruise	50,000	1999
Seven Seas Navigator	Admiralteisky Shipyard	Passenger Cruise	25,000	1999
Civitavecchia	C.N. Visentini di Visentini	Passenger Cruise	25,000	2000
Mariotti 982	C.N. Visentini di Visentini	Passenger Cruise	25,000	2001
Stad Amsterdam	Damen Oranjewerf	Passenger Sailing	698	2000
Volendam	Fincantieri	Passenger Cruise	62,000	1999
R Eight	Chantiers d'Atlantique	Passenger Cruise	30,277	2001
Sea Cloud II	Astilleros Gondan	Passenger Sailing	5,000	1999
Superstar Scorpio	Meyer Werft	Passenger Cruise	85,000	2002
Hull #499	Kvaerner Masa Yards	Passenger Cruise	84,000	2002
Royal Clipper	Stocznia Gdanska	Passenger Sailing	5,000	2000
Rivage Martinique	Ch. Nav de Marseille	Passenger Twin-Hull	500	2000
Rivage Saint Martin	Austal Ships Pty.	Passenger Twin-Hull	800	1999
Ingalls Pascagoula	Ingalls SB. Div. Of Litton	Passenger Cruise	72,000	2003
R Seven	Chantiers d'Atlantique	Passenger Cruise	30,277	2000
L'Atlantique X31	Chantiers d'Atlantique	Passenger Cruise	49,000	2002
L'Atlantique V31	Chantiers d'Atlantique	Passenger Cruise	49,000	2001
Seven Seas Mariner	Chantiers d'Atlantique	Passenger Cruise	46,500	2001
R Five	Chantiers d'Atlantique	Passenger Cruise	30,277	2000
Voyager of the Seas	Kvaerner Masa Yards	Passenger Cruise	142,000	1999
Explorer of the Seas	Kvaerner Masa Yards	Passenger Cruise	142,000	2000
Ingalls Pascagoula	Ingalls SB. Div. Of Litton	Passenger Cruise	72,000	2004
Adventure of the Seas	Kvaerner Masa Yards	Passenger Cruise	142,000	2002
Mistral	Chantiers d'Atlantique	Passenger Cruise	47,900	1999
R Six	Chantiers d'Atlantique	Passenger Cruise	30,277	2000
L'Atlantique U31	Chantiers d'Atlantique	Passenger Cruise	87,000	2002
L'Atlantique R31	Chantiers d'Atlantique	Passenger Cruise	87,000	2000
L'Atlantique S31	Chantiers d'Atlantique	Passenger Cruise	87,000	2001
L'Atlantique T31	Chantiers d'Atlantique	Passenger Cruise	87,000	2001
R Three	Chantiers d'Atlantique	Passenger Cruise	30,277	1999
R Four	Chantiers d'Atlantique	Passenger Cruise	30,277	1999
Steiner 321	USA117057	Passenger Ferry	200	1999
McTay 125	McTay Marine	Passenger Ferry	199	2000
Stalsmidjan 10	Stalsmidjan hf	Passenger Ferry	110	1999
Pal Indonesia M000122	P.T. Pal Indonesia	Passenger Ferry	800	1999
Pal Indonesia M000126	P.T. Pal Indonesia	Passenger Ferry	800	1999
Ferrari 229	Cantiere Navale Ferrari	Passenger Ferry	670	2000
Penguin Seletar	Aluminium Craft	Passenger Ferry	139	1999
Austal 67	Austal Ships	Passenger Ferry	200	1999
Dynasty 2000	York Marine	Passenger Ferry	100	1999
Marinteknik Sing 161	Marinteknik	Passenger Ferry	556	1999
Austal 66	Austal Ships	Passenger Ferry	200	1999
Austal 65	Austal Ships	Passenger Ferry	200	1999
Yokohama Yacht 9560	Yokohama Yacht	Passenger Ferry	199	1999
McTay 124	McTay Marine	Passenger Ferry	199	2000
Aegean Sea	Ast. Construcciones	Passenger Ferry	1,352	1999
McTay 123	McTay Marine	Passenger Ferry	199	1999
Aurora Okushiri	Naikai Zosen Corp.	Passenger Ferry	2,270	1999
Imabari Imabari 555	Imabari Zosen	Passenger Ferry	9,300	1999
S.M.E.B. 183	Cantiere Navale	Passenger Ferry	150	1999
S.M.E.B. 182	Cantiere Navale	Passenger Ferry	150	1999
S.M.E.B. 181	Cantiere Navale	Passenger Ferry	150	1999
S.M.E.B. 180	Cantiere Navale	Passenger Ferry	400	1999
Rodriguez 272	Cantiere Navale Rodriq.	Passenger Ferry	540	1999
Rodriguez 273	Cantiere Navale Rodriq.	Passenger Ferry	540	1999
Nurshah Kota Tinggi	Naval Dockyards	Passenger Ferry	450	1999
Jangja Ferry	Kwangyang Shipbuilding	Passenger Ferry	120	1999
Waxholm	Baatservice Holding	Passenger Ferry	280	1999
SBF SB 982	SBF Shipbuilders	Passenger Ferry	250	2000
Sokol	Nevskiy Shipyard	Passenger Ferry, Twin-Hull	150	1999
Nurshah Muar	Naval Dockyards	Passenger Ferry	450	1999
Innovateur Jr.	USA456052	Passenger Ferry, Quad-Hull	150	1999
Discovery Bay 8	Marinteknik Shipbuilders	Passenger Ferry, Twin-Hull	611	1999
Pequot River 4	Pequot River Shipworks	Passenger Ferry, Twin-Hull	450	1999
Sleipner	Austal Ships	Passenger Ferry, Twin-Hull	500	1999
Lake Star II	WaveMaster	Passenger Ferry	191	1999
Waterfront 2	WaveMaster	Passenger Ferry	145	1999
Kristen	WaveMaster	Passenger Ferry	171	1999
Pequot River	Pequot River Shipworks	Passenger Ferry, Twin-Hull	364	1999
Arvandan 73/106	Arvandan Shipbuilding	Passenger Ferry, Twin-Hull	300	2000
FBM Marine 1457	FBM Marine Limited	Passenger Ferry, Twin-Hull	800	1999
Fjordprinsessen	Oma Baatbyggeri	Passenger Ferry, Twin-Hull	250	1999
Caraipe Jet	International Shipyards	Passenger Air Cushion, Twin-Hull	500	1999
Vavau	NQEA Australia Pty.	Passenger Ferry, Twin-Hull	290	1999
True North	Image Marine Group	Passenger	270	1999
Hvide Sande 90	Hvide Sande Skibs	Passenger	120	1999
Naikai Setoda 657	Naikai Zosen Corp.	Passenger	399	2000
Ordzhonikidze Poti	S. Ordzhonikidze Works	Passenger Hydrofoil Ferry	344	1999
Seaspeed 009	Seaspeed	Passenger Hydrofoil Ferry	200	1999
Cloud X	USA104059	Passenger SWATH Ferry	1,025	1999
FBM-Aboitiz 1003	FBM Aboitiz Shipbuilders	Passenger Ferry, Twin-Hull	660	1999
Sleipner	Austal Ships	Passenger Ferry, Twin-Hull	500	1999
Lake Star II	WaveMaster	Passenger Ferry, Twin-Hull	191	1999
Waterfront 2	WaveMaster	Passenger Ferry	145	1999
Kristen	WaveMaster	Passenger Ferry	171	1999
Draioct Na Farrage	WaveMaster	Passenger Ferry	316	1999
WaveMaster 177	WaveMaster	Passenger Ferry	200	1999
Canal Naval Cons 500	Canal Naval Cons. Co.	Passenger Ferry	500	1999
Marinteknik Sing161	Marinteknik Shipbuilders	Passenger Ferry, Twin-Hull	611	1999
Auto Jet	Marinteknik Shipbuilders	Passenger Ferry, Twin-Hull	200	1999
Gekka 2000	Image Marine Group	Passenger Ferry, Twin-Hull	550	1999
NQEA 206	NQEA Australia Pty.	Passenger Ferry, Twin-Hull	250	1999
MOTU TAPU ORA	NQEA Australia Pty.	Passenger Ferry, Twin-Hull	250	1999
WaveMaster 147	WaveMaster	Passenger Ferry	450	1999
Austal 79	Austal Ships	Passenger Ferry, Twin-Hull	908	1999

Source: Lloyd's Register

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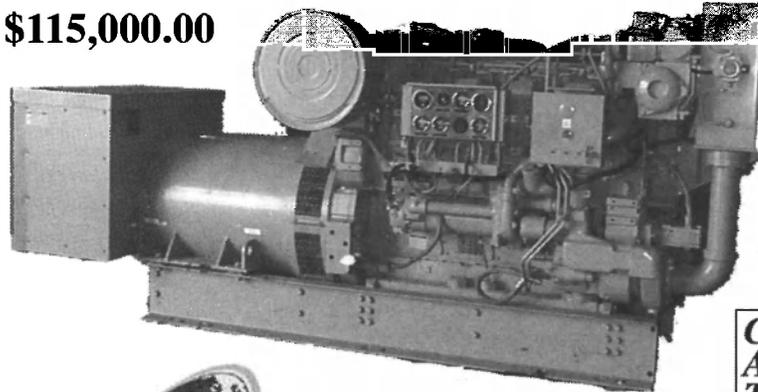
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## Marine Diesel Power Notes

### Perkins Adds To Engine Line

The latest additions to the 65 hp to 800 hp Perkins Sabre marine diesel engine range was recently unveiled and are available in North America.

The new Perkins Sabre M92 is a 4-cylinder, 4-liter naturally aspirated 92 hp engine.

The turbocharged version — the

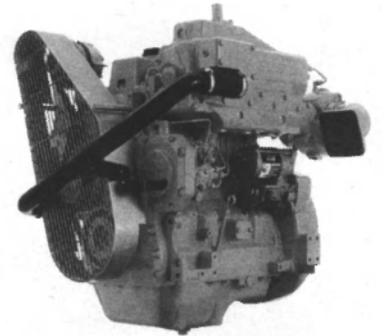


Perkins Sabre M115T — develops 115 hp at 2,400 rpm.

The new engines replace the popular Perkins Sabre M90/4.236, many of which have been in operation for decades. The engine is intended for commercial and pleasure applications.

Circle 63 on Reader Service Card

### Deere Expands Powertech Line



The Powertech 4.5L, Model 4045.

Enhancing its position in the maritime marketplace was the driving force behind John Deere's introduction of the Powertech versions of its 4.5, 6.8 and 12.5 liter marine engines. The Powertech line is designed for improved application flexibility, greater performance via better fuel economy and raised power ratings, and expanded horsepower range (from 75 to 450 hp). It also, with the 12.5 L offering, marks the first time John Deere has ventured above 7.6 liters for marine applications.

The Powertech 4.5L, four cylinder turbocharged engine (pictured) offers 105 hp at 2,300 rpm, 120 hp at 2,400 rpm, 135 hp at 2,500 rpm and 150 hp at 2,600 rpm.

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Fax: +31 (0)180 511578  
E-mail: 100417.654@compuserve.com  
Internet: www.vdvelden.nl

Agent for the U.S.A.  
Ships Machinery International Inc.  
8357 N.W. 56 Street  
Miami FL 33166 USA  
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Fax: (504) 362-0565

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Fax: (281) 999-7722

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1920 Avenue C  
Office: (334) 438-5130  
Fax: (334) 438-5142  
Toll Free: (888) 659-5130

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1533 Rear N. Central Ave.  
Office: (956) 838-1278  
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**ComNav Marine Ltd.**  
1915 Stainsbury Avenue  
Vancouver, BC, Canada V5N 2M6

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### Two-Stroke Engine Is "Emissions Compliant"



The first IMO certificate for a large two-stroke diesel engine was issued by Germanischer Lloyd on behalf of the Danish Maritime Authority to MAN B&W Diesel A/S of Copenhagen in May. The engine is a 12K90MC model with a rating of 74,640 bhp tested in Ariake, Japan, by MAN B&W Diesel licensee Hitachi Zosen Corp. For powering an A.P. Moller containership, which was under construction at the Lindo Shipyard in Denmark.

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### Caterpillar Ships New 3500B Marine Engines

Caterpillar has started shipment of the new, more powerful versions of its 3512B and 3516B engines. The new version of the Caterpillar 3512B and 3516B engines have a longer stroke than

Maritime Reporter/Engineering News

the standard 3500 Series B engines, providing more displacement, therefore generating more power. Power is reportedly increased by up to 13 percent, giving the new 3516B a continuous rating of 2,260 bhp and a top commercial rating of 2,500 bhp at 1,600 rpm. In addition, the engine also saves on fuel, with a reported seven percent improvement in power to weight ratios and a seven percent improvement in fuel economy.

Displacement is increased through component changes to the crankshaft, connecting rods and pistons that lengthen engine stroke by 25.4 mm (1 in.) from 190 mm to 215 mm (7.5 to 8.5 in.). This adds more than a half a liter per cylinder, giving the new 3516B engine 78.1 liters (4,763 cu. in.) of displacement.

Turbochargers and aftercoolers use the same technology proven in 3500 Series B engines, but capacities are increased.

Circle 66 on Reader Service Card

### New Marine Diesel Jointly Produced

The Austria-based engine manufacturer Steyr-Daimler-Puch Motorentechnik has launched two new lightweight marine high speed diesels, to be distributed by the Danish Company Aabenraa Motorfabrik. The new brand name is Bukh+Steyr Solas and the two new engines are approved according to Solas/IMO. The following are technical details of the two new units:

Name	Cyl.	Displ.	Power	Weight
Bukh+Steyr Solas 144 vti	4	2.13 lt.	106 kW (144 hp)	265 kg
Bukh+Steyr Solas 236	6	3.2 lt.	156 kW (212 hp)	305 kg

They are designed for high reliability and efficiency, feature high-pressure unit injectors (up to 2,000 bar); a monoblock design without cylinder head gasket; and noise encapsulation. While application parameters are varied, the engines are said to be particularly suited for fast rescue boat, RIB, patrol boat, firefighting vessel and special mission boat applications.

Circle 68 on Reader Service Card

### Alstom Delivers Powerful Product Offerings

Alstom Engines Ltd. — comprised of Paxman, Ruston, Mirrlees Blackstone and Regulateurs Europa — manufactures high and medium-speed diesel, heavy fuel, dual fuel and gas engines, as well as a range of engine control and monitoring equipment.

The Paxman division manufactures

compact, high speed diesel engine in the power range from 610 to 4,000 kWb for marine propulsion and auxiliary applications. Primary markets include the world's navies, coastguards, police and customs and excise forces, as well as the commercial fast ferry and super yacht markets.

The Ruston division primarily serves

the fast ferry, military and other commercial markets with a line of medium speed diesel, heavy fuel and dual fuel engines for main propulsion and auxiliary duty. The power range is 780 to 7,550 kWb. Mirrlees Blackstone prime movers are used as single or multi-unit installations in a wide range of vessels, including conventional ferries, tankers,

bulk carriers, trawlers, dredgers and naval ships. This unit's power range spans from 2,000 to more than 15,000 kWb. Alstom Regulateurs Europa design and produce electronic and mechanical governors and actuators, as well as a range of monitoring and control equipment for the marine markets.

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Telephone: +1 713 939 0073 Fax: +1 713 939 0105

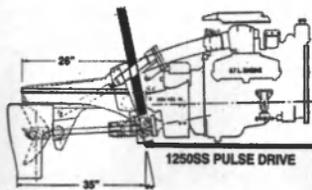
www.alstom.com www.engines.ind.alstom.com

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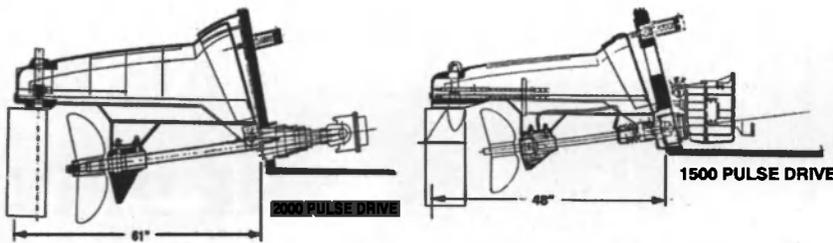
# PULSE-DRIVE



US patent #5,326,294



## Trimable Surface Drive



Ask about PSI propellers



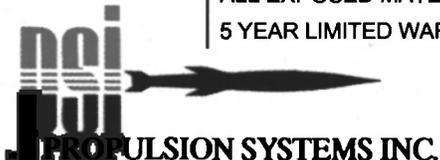
## SPECIFICATIONS

PULSE DRIVE MODELS:	1000	1000 DUAL	1250SS	1500SX	1250 LONG	1250 DUAL	1500	1500 DUAL	1500 SS	2000	2500	3000
TYPICAL VESSEL SIZE	UP TO 20'	UP TO 26'	UP TO 26'	UP TO 26'	UP TO 36'	UP TO 42'	UP TO 42'	UP TO 50'	UP TO 36'	28'-50'	40'-65'	50'-85'
HORSE POWER RANGE (Approx)												
PLEASURE CRAFT RATING	120	TWIN 120	300	500	300	TWIN 300	650	TWIN 650	650	1000	1250	1600
TORQUE LIMITS IN FT.LBS.@Propeller	220	TWIN 220	500	650	500	TWIN 500	800	TWIN 800	800	1800	3600	6100
MAXIMUM PROPELLER DIAMETER	12"	12"	15"	15"	18"	18"	20"	20"	20"	24"	28"	34"
SHAFT SIZE DIAMETER IN INCHES	1"	1"	1.25"	1.5"	1.25"	1.25"	1.5"	1.5"	1.5"	2"	2.5"	3"
WEIGHT IN LBS.	42	90	110	140	170	190	205	285	225	350	650	990
EXTERNAL LENGTH FROM TRANSOM	32"	32"	32"	32"	48"	42"	48"	48"	43"	60.25"	67.5"	81"
RUDDER ANGLE	80°	80°	80°	80°	80°	80°	80°	80°	80°	80°	80°	80°
PROPELLER TRIM	6°	6°	6°	6°	6°	6°	6°	6°	6°	6°	6°	6°
HOUSING MATERIAL	KNITTED UNIDIRECTIONAL FIBERGLASS/VINYLESTER COMPOSITE											

This page contains General Information and Specifications which are subject to evaluation by PSI. A PSI Data Sheet SHOULD be completed and submitted to our engineering department in order to assure the proper unit can be sized for the desired application. NOTE: Larger custom applications available.

## ADVANTAGES

- EASILY INSTALLED, LOW MAINTENANCE
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- PULSE DRIVES ARE DESIGNED FOR A WIDE RANGE OF POWER ACCEPTANCE
- ENGINE EXHAUST CAN BE DIRECTED THROUGH THE DRIVE HOUSING, MAKING A QUIET EXHAUST FREE RIDE
- ALL EXPOSED MATERIALS ARE NON-CORROSIVE MATERIALS; BRONZE, STAINLESS STEEL OR COMPOSITE MATERIALS
- 5 YEAR LIMITED WARRANTY - PLEASURE CRAFT OR 2 YEAR LIMITED WARRANTY - COMMERCIAL VESSEL



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# Marine Diesel Engine Guide

In the background: Wartsila NSD's new Sulzer RTA60C marine diesel engine (See story on page 13).

## Alaska Diesel Electric

4420 14th Ave NW, P.O. Box 70543

Seattle, Wash. 98107

Tel: 206-789-3880

Fax: 206-782-5455

Email: [ade@northern-light.com](mailto:ade@northern-light.com)

Website: <http://www.northern-light.com/>

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
L-12V140A	140	165	4	12V	59-80.75				708-969
L-6108A2	108	130	4	6L	37-50.5				222-303
L-6125A	125	150	4	6L	40-61.7				240-370
L-6140AL	140	165	4	6L	58-87.2				348-523
L-6140AL2	140	165	4	6L	61.6-86.3				370-518
L-6170A	170	170	4	6L	87.2-102.5				523-615

## Alstom Engines Ltd. (Mirreles Blackstone)

Bramhall Moor Lane

Hazel Grove, Stockport, Cheshire SK7 5AH United Kingdom

Tel: 011-44-161-48-1000

Fax: 011-44-161-487-1465

Email: [mirreles.blackstone@ind.alstom.com](mailto:mirreles.blackstone@ind.alstom.com)

Website: <http://www.engines.alstom.com>

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
K Major	400	457	4	6, 8, 9L, 12, 16V	544	600	19	6.14	2980-8710
MB430M	430	520	4	12, 16, 18V	865	600	23	10.4	8682-15627
MB430L	430	560	4	6, 8, 9L	800	514	23	9.6	4680-7200
MB430V	430	480	4	12, 16V	730	600	23	9.6	7997-11683

## Alstom Engines Ltd. (Paxman Division)

Hythe Hill

Colchester, Essex CO1 2HW United Kingdom

Tel: 011-44-1206-795151

Fax: 011-44-1206-797869

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
VALEN TA	197	216	4	6L, 8, 12, 16, 18V	101-192	1200-1640	15.4-21.3	8.64-11.81	610-3450
VP185	185	196	4	12, 18V	147-222	1500-1950	25.96	9.8-12.74	1760-4000

## Alstom Engines Ltd. (Ruston Division)

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
RK215	215	275	4	6L, 8, 12, 16V	158	720-1,000	21.7	9.2	780-3,160
RK270	270	305	4	6, 8L, 12, 16, 20V	378	720-1,030	23.64	10.16	1,500-7,550
RK270HF	270	305	4	6, 8L, 12, 16, 20V	253	720-1,030	17.36	10.16	1,320-5,050

## Anglo Belgian Corp.

9958 North Alpine Rd., Ste. 101, Machesney Park, Ill. 61115

Tel: 815-637-2880

Fax: 815-637-2877

Model

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
DX	242	320	4	3, 6, 8I	110	750	12.0	8.0	330-880
DZ	256	310	4	6, 8I	221	1,000	16.6	10.3	1,032-1,768

## Caterpillar

P.O. Box 610

Mossville, Ill. 61552

Tel: 309-578-6298

Fax: 309-578-2559

Email: [cat\\_power@cat.com](mailto:cat_power@cat.com)

Website: <http://www.cat-engines.com>

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
3116TA	105	127	4	6L	25.5-43.5	2400-2800	11.6-16.9	10.16-11.85	153-261
3126TA	110	127	4	6L	47.8-52.2	2800	7.0-15.5	11.85	287-313
3196	130	150	4	6L	60.8-82.0	2300	7.3-12.1	11.50	365-492
3208T	114	127	4	8V	20.0-29.9	2400-2800	7.7-9.8	10.16-11.85	160-239
3208TA	114	127	4	8V	21.9-40.5	2400-2800	8.4-13.3	10.16-11.85	175-324
3304T	121	152	4	4L	23.5-35.5	2000-2200	7.9-11	10.10-11.1	93-142
3306T	121	152	4	6L	23.7-34.8	2200-2200	8.1-11.9	10.10-11.1	142-209
3306TA	121	152	4	6L	26.7-44.2	2000-2200	9.1-13.7	10.10-11.1	168-265
3406E	137	165	4	6L	56.0-99.5	1800-2300	15.3-21.3	9.90-12.6	336-597
3406T	137	165	4	6L	31.0-50.0	1800-2100	8.5-11.7	9.90-11.5	186-300
3406TA	137	165	4	6L	34.2-72.2	1200-2100	14-16.9	6.60-11.5	205-433
3408TA	137	152	4	8V	32.6-54.5	1250-2100	13.9-18.8	6.30-10.6	261-436
3412T	137	152	4	12V	31.2-39.5	1800	9.2-23.5	9.12	375-474
3412TA	137	152	4	12V	26.4-47.5	1200-2100	17.6-18	6.08-10.64	317-570
3412TAA	137	152	4	12V	51.2-83.9	2100-2300	19.3-29.1	10.64-11.6	615-1007
3508B	170	190	4	8V	93.2-140	1600-1925	16.2-20.2	10.10-12.2	746-1119
3512B	170	190	4	12V	55.9-140	1200-1800	12.9-16.5	7.60-11.4	447-1678
3516B	170	190	4	16V	93.2-139.8	1600-1925	18.6-21.2	10.10-12.2	1492-2237
3606TA	280	300	4	6L	248-338	750-1000	20-23.7	7.50-10	1490-2030
3608TA	280	300	4	8L	248-339	750-1000	20-23.7	7.50-10	1980-2710
3612TA	280	300	4	12V	248-375	750-1000	20-23.7	7.50-10	2980-4500
3616TA	280	300	4	16V	248-375	750-1000	20-23.7	7.50-10	3960-6000
3618TA	280	300	4	18V	400	1050	24.7	10.7	7200

## Cummins Engine Company

4500 Leeds Ave., Ste. 301, Charleston, S.C. 29405

Tel: 843-745-1628, Fax: 843-745-1549

Email: [wavemaster@cummins.com](mailto:wavemaster@cummins.com)

Website: <http://www.cummins.com/marine/marinehm.html>

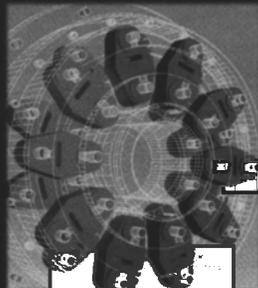
Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
483.9-M	102	120	4	4L	14.3-15	2500-2800	652-693	8.8-11.2	57-60

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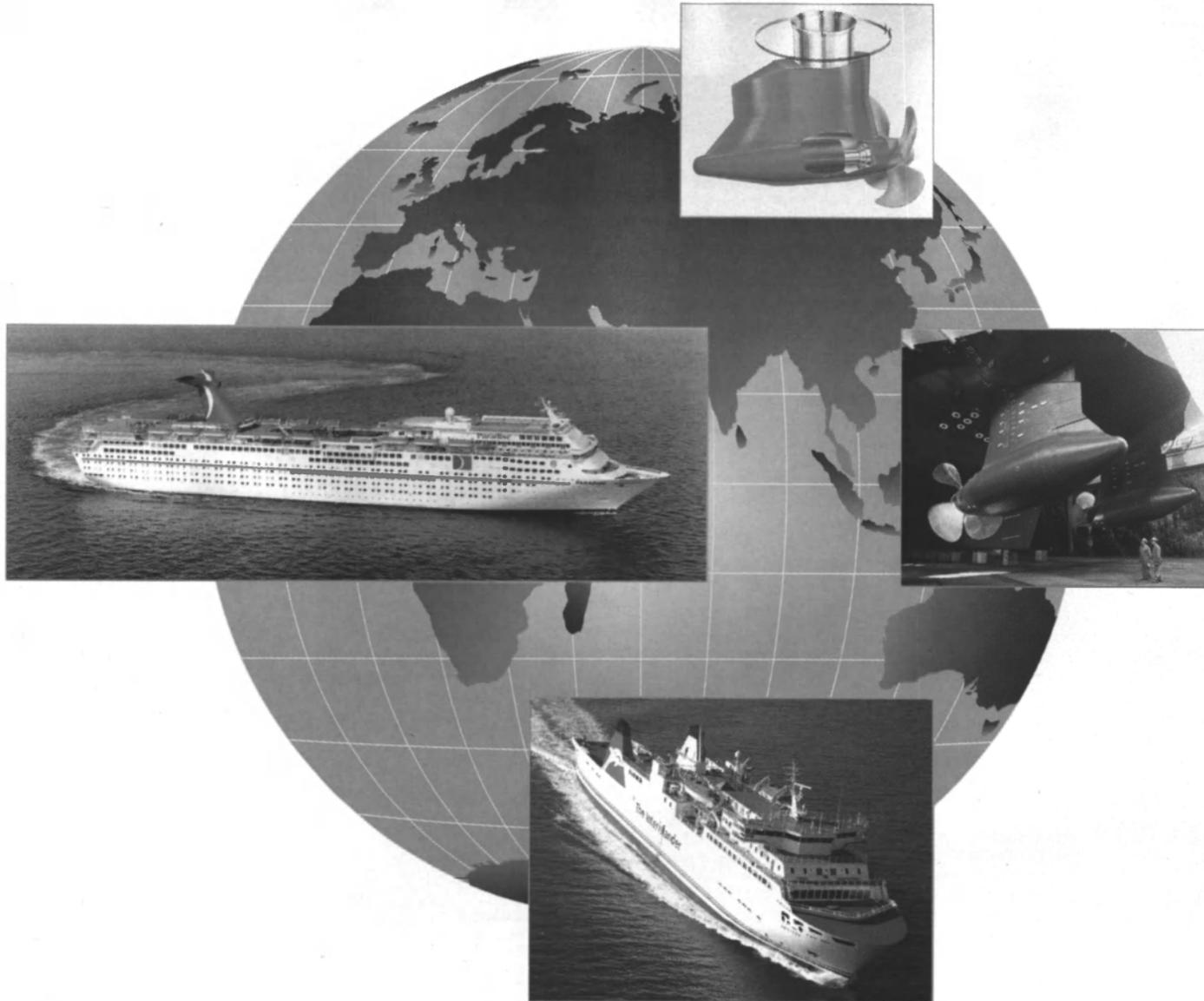
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ABB Azipod Oy, Laivanrakentajantie 2, 00980 Helsinki, Finland. Tel. +358 10 222 030, Fax +358 10 222 6060  
ABB Automation Inc., 2900 SW 2<sup>nd</sup> Ave Ft Lauderdale, FL 33315-3122, USA. Tel. +1 954 763 8600, Fax +1 954 763 4849

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## Marine Diesel Engine Guide

4BT3.9-M	102	120	4	4L	24.3-28	2500-2800	1186-1222	10.0-11.2	97-112
6B5.9M	102	120	4	6L	14.3-15	2500-2800	652-700	10.0-11.2	86-90
6BT5.9-M	102	120	4	6L	22.3-26.2	2500-2600	925-1228	10.0-10.4	134-157
6BTA5.9-M (LW)	102	120	4	6L	28-32.3	2500-2600	1338-1524	10.0-10.4	168-194
6BTA5.9M (SW)	102	120	4	6L	34.8-39.2	2600-2800	1462-1712	10.4-11.2	209-235
6CTAB.3-M (LW)	114	135	4	6L	31.3-37.3	2100-2500	1286-1296	9.5-11.3	188-224
6CTAB.3-M (SW)	114	135	4	6L	43.5-53.5	2500-2600	1517-1841	11.2-11.7	261-321
NB55-M	140	152	4	6L	24.2-26.7	1800-1950	704-851	9.1-9.9	145-160
NTB55-M	140	152	4	6L	29.8-44.8	1800-2100	958-1206	9.1-10.7	179-269
NTAB55-M	140	152	4	6L	43.5-49.7	1800-2100	1216-1351	9.1-10.7	261-298
N14-M	140	152	4	6L	44.8-65.3	1800-2100	1280-1702	9.2-10.6	269-392
KT19-M	159	159	4	6L	45.3-63.3	1800-2100	962-1241	9.5-11.1	272-380
KTA19-M	159	159	4	6L	62-68.3	1800-2100	1243-1400	9.5-11.1	372-410
KTA19-M3	159	159	4	6L	74.5-79.5	1800	1554-1686	9.5	447-477
KTA19-M4	159	159	4	6L	87	2100	-	11.1	522
QSK19-M	159	159	4	6L	82	1800	-	9.5	492
KTA38-M0	159	159	4	12V	46.6-52.8	1600-1800	1108-1115	8.4-9.5	559-633
KTA38-M1	159	159	4	12V	55.9-68.4	1600-1800	1328-1576	8.4-9.5	671-821
KTA38-M2	159	159	4	12V	65.3-93.3	1600-2050	1548-1755	8.4-10.8	783-1119
KTA50-M2	159	159	4	16V	65.3-93.3	1600-2050	1548-1737	8.4-10.8	1044-1492
QSM11-M	125	147	4	6L	72.2	2300	2084	11.3	433

### Cummins Wartsila

BP 115-La Combe  
Surgeres F-17700 France  
Tel: 011-33-5-46-303132  
Fax: 011-33-5-46-303159

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
6L170	170	200	937-1059	690-780	1600-1800	27			
8L170	170	200	1250-1413	920-1040	1600-1800	36			
12V170	170	200	1875-2119	1380-1560	1600-1800	54			
16170	170	200	2500-2826	1840-2080	1600-1800	73			
18V170	170	200	2812-3179	2070-2340	1600-1800	82			
12V200	200	200	2850-3260	2100-2400	1200-1500	90			
16V200	200	200	3800-4350	2800-3200	1200-1500	120			
18V200	200	200	4280-4890	3150-3600	1200-1500	135			

### Deere Power Systems

3801 W. Ridgeway Ave.  
Waterloo, Iowa 50704  
Tel: 319-292-5063  
Fax: 319-292-5075

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
Powertech 4045DFM	106	127	4	4L	15.75	2400-2500			56-63
6076AFM	115	121	4	6L	37.3	2200-2400			160-224
Powertech 4045TFM	106	127	4	4L	25.25	2300-2500			78-101
Powertech 6068TFM	106	127	4	6L	28	2300-2600			116-168
Powertech 6125AFM	127	165	4	6L	56	1800-2100			254-336

### Detroit Diesel

13400 Outer Drive West  
Detroit, Mich 48239  
Tel: 313-592-5000  
Fax: 313-592-7288

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
12V-149N	146.05	146.05	2	12V	49.7	1900	6.42	9.25	596.4
12V-149T	146.05	146.05	2	12V	65.3	1900	8.42	9.25	783.6
12V-149TI	146.05	146.05	2	12V	77.7	1900	10.03	9.25	932.5
12V-71N	107.95	127	2	12V	31.1	2300	7.36	9.74	373.2
12V-71TI	107.95	127	2	12V	46.6-54.1	2300	10.45-12.13	9.74	497-559
12V-92N	122.94	127	2	12V	33.1	2100	6.27	8.9	397.2
12V-92TA	122.94	127	2	12V	67.16	2300	11.91	9.74	805.92
16V-149N	146.05	146.05	2	6V	49.4	1900	6.83	9.25	790.4
16V-149T	146.05	146.05	2	16V	64.6	1900	8.32	9.25	1033.6
16V-149TI	146.05	146.0	2	16V	83.9	1900	10.83	9.25	1342.8
16V-71N	107.95	127	2	16V	31.1	2300	6.96	9.74	497.6
16V-92N	122.94	127	2	16V	35.4	2100	6.36	8.9	566.4
4-53N	98.55	114.3	2	4L	25.4	2800	6.25	10.67	101.6
4-71N	107.95	127	2	4L	31.1	2300	6.98	9.74	124.4
6-71M	107.95	127	2	6L	32.8	2300	7.36	9.74	296.8
6-71N	107.95	127	2	6L	31.1	2300	6.97	9.74	180.6
6V-53N	98.55	114.3	2	6V	26.1	2800	6.44	10.67	156.6
6V-53T	98.55	114.3	2	6V	29.8	2800	9.80	10.67	156.6
6V-71N	107.95	127	2	6V	31.1	2300	7.36	9.74	1186.6
6V-71TA	107.95	127	2	6V	54.1	2300	12.13	9.74	324.6
6V-92N	122.94	127	2	6V	36.2	2300	6.26	9.74	217.2
6V-92TA	122.94	127	2	6V	59.1	2300	10.21	9.74	354.6
8V-149TI	146.05	146.05	2	8V	74.6-83.9	1900	9.63-10.83	9.25	596.8-671.2
8V-71N	107.95	127	2	8V	31.1	2300	9.96	9.74	248.8
8V-71TI	107.95	127	2	8V	43.1	2300	9.66	9.74	344.8
8V-92N	122.94	127	2	8V	36.2	2300	6.26	9.74	289.6
8V-92TI	122.94	127	2	8V	56-60.6	2300	9.67-10.48	9.74	448-484.8

### Deutz Canada

4420 Garand St.  
Montreal, Que. H4R 2A3 Canada  
Tel: 514-335-3150  
Fax: 514-332-4173  
Email: deutzcan@msn.com  
Website: <http://www.deutzcanada.com>

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
TBD616	132	160	4	8,12,16V	60	2100	15.37	11.2	320-960
TBD620	170	198.5	4	8,12,16V	127	1800	19.1	11.7	915-2032
BVM628	240	280	4	6,8,9L	225	1000	21.3	9.3	1035-2025
BVM628	240	280	4	12,16L	225	1000	21.3	9.3	2070-3600
TBD645	330	450	4	6,8,9L	460	650	22.1	9.8	2550-4140
BVM640	370	420	4	12,16V	440	650	18.9	9.1	4040-7060

### Deutz MWM AG

Postfach 102263  
Mannheim D-68140 Germany  
Tel: 011-49-621-384751  
Fax: 011-49-621-384211

Model	Bore	Stroke	Cycle	Cyl#	kw/cyl	RPM	BMEP	Mean Piston Speed	Output
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(Continued on page 38)

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## Marine Diesel Power Notes

# New Cat Engines Offer Fuel Savings, Low Emissions for OSVs

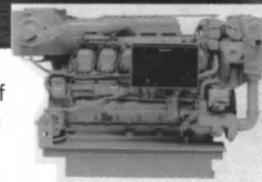
A new Caterpillar engine-powered diesel electric propulsion system is being touted as delivering fuel savings between 30 and 50 percent. This new system has been recently installed on two new OSVs: Olympic Princess, built

by Brattvaag Skipsverft AS in Norway; and Stril Supplier, built by YVC Ysselwarf in Rotterdam.

Olympic Princess, built for Norwegian shipping specialist Olympic Shipping, measures 274.6 by 64.6 ft. The 4,158

dwt OSV features four Caterpillar 3516B 69 liter V16 cylinder turbocharged and aftercooled engines, each rated at 2,585 hp @ 1,800 rpm.

The vessel is designed to transport equipment, cargo pipes, cement, liquid



Caterpillar has begun shipment of its new 3500 high displacement engines - units which offer up to 13 percent more power and a seven percent improvement in power-to-weight ratios and a seven percent improvement in fuel economy. The units are found onboard the latest OSV to go into the Simon Møkster Shipping AS fleet, Stril Power.

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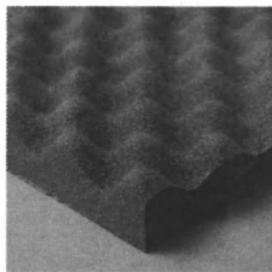
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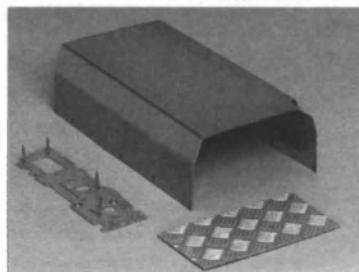
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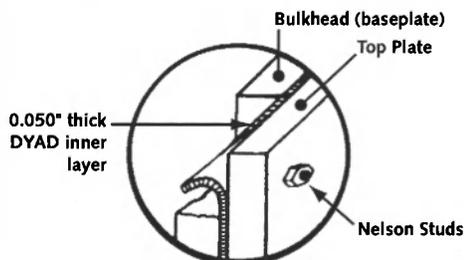
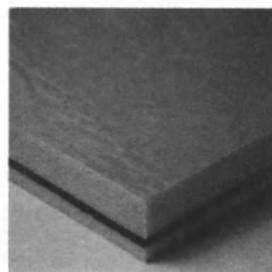
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**Website:** www.soundcoat.com  
**E-mail:** sales@soundcoat.com

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mud, fuel oil, brine, freshwater and base oil to, from and between offshore platforms and installations, as well as using its large accommodation (50 persons) and dual dynamic positioning system to perform different operations, including ROVs (Remote Operated Vehicles) for oil exploration and other sea bed work.

Currently, the vessel is carrying out ROV work for Subsea. In this mode, early indications are fuel savings will be achieved between 30 and 50 percent, according to Bjorn Kvaalsund, manager.

"The four engine diesel electric system allows us to achieve maximum efficiency by matching the power requirement we have, to the configuration of the diesel electric system."

Power is supplied through four Siemens 1FC2564, 2110 kVA main generators and two Siemens 1LL1567-6ZZ90-Z, 2,200kW propulsion motors, with two Aquamaster CRP 15 contrarotating propellers, an Aquamaster UL1201 rotatable 883 kW thruster and a Kamewa TT 2200, 883 kW thruster. A Caterpillar 3406T 270 kW engine with Siemens 1FC8 460 kVA generator set provides emergency back-up and harbor power onboard.

Stril Supplier was built for Simon Møkster Shipping AS of Stavanger, Norway. The 273 x 64.6 ft. (83 x 19.6 m) vessel is the newest addition to the company's fleet of 24 ships, which includes two 95-passenger fast ferry catamarans, two dry cargo carriers operating in the North Sea region, and 20 offshore safety, rescue, supply and support vessels. The fleet includes two of the first multi-purpose newbuild vessels, built exclusively for FPSO support (Stril Power and Stril Borg, both with twin Cat 3616 main engine packages). The Cat engines deliver power via Siemens generators to two duo-prop Aquamaster Azimuth main prop thrusters at the stern, a single prop Aquamaster azimuth thruster forward and a single Kamewa tunnel type bowthruster.

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CORPORATION

# Marine Diesel Engine Guide

	(mm)	(mm)	II/V		Speed	Range
616	132	160	4 8,12,16V	85	2300	15.7
620	170	195	4 8,12,16V	140	1860	19.2
628	240	280	4 6,8,9,12,16V	225	1000	21.3
632	250	320	4 6,8,9,12,16,18V	385	1200	21.8
640	370	400	4 12,16V	441	650	18.9
645	330	450	4 6,8,9,1	460	650	22.1
						9
						2550-4140

## Electro-Motive Div. of General Motors Corp.

9301 West 55th Street, La Grange, Ill. 60525

Tel: 708-387-5853, Fax: 708-387-5845, Website: <http://www.gmcmd.com>

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
645E6	230	254	2	8,12,16V	74-98	720-900	5.6-6.26	6.1-7.6	595-1567

## Fairbanks Morse (Coltec Industries)

701 White Ave.

Beloit, Wis. 53511

Tel: 608-364-8100

Fax: 608-364-8233

Website: <http://www.fairbanksmorse.com/>

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
3808-1/8	206.4	254	2	4-12L	132-149.3	750-900	5.9-6.2	6.35-7.6	2528-1790
38TD8-1/8	206.4	254	2	6,9,12L	217.5-261	750-900	10.2	6.35-7.62	1305-3132
FM/ALCO 251	228.6	266.7		46L,8,12,16,18V	80-184.4	750-1200	6.4-10.67	6.4-10.67	480-2950

## GEC Alstom Ruston Diesels

Newton-LE-Willows

Merseyside WA3 2EP United Kingdom

Tel: 011-44-1925-225151

Fax: 011-44-1925-222055

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
RK215	215	275	4	6L, 8,12, 16V	158	720-100	21.70	9.2	780-3160
RK270	270	305		46,8L,12,16, 20 V	378	720-1030	23.64	10.16	1500-7550
RK 270 HF	270	305		46,8L 12,16, 20V	253	720-1030	17.36	10.16	1320-5050

## GMT

Bagnoli Della Rosandra

Trieste 334 Italy

Tel: 011-39-40-3193111

Fax: 011-39-40-827371

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
A32	230	390		46,8,9L,12,14,16V	440	720-750	22.5	9.75	2640-7040
A32G	230	390		46,8,9L,12,14,16V	360	720-750	18.36	9.75	2160-5760
A55	550	680		46,8,9L,12,14,16,18V	1250	425-428	21.8	9.6	7500-22500
A55DF	550	680		46,8,9L,12,14,16,18V	1000	428	17.4	9.7	6000-18000
BL230	230	310		44,6,8,9L,12,16,18,20V	222	1050	19.7	10.8	890-4450
BL230P	230	310		44,6,8,9L,12,16,18,20V	190	720-1000	17.4	10.3	730-3800

## Hedemora Diesel A/B

Box 206

Hedemora 776 28 Sweden

Tel: 011-46-225-15540

Fax: 011-46-225-15440

Email: [diesel@hedemoradiesel.se](mailto:diesel@hedemoradiesel.se)

Website: <http://www.hedemoradiesel.se>

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
V12A	185	210	4	12V	75-125	1000-1500	16-18	7.0-10.5	900-1500
V12B	210	210	4	12V	96-158	1000-1500	16-18	7.0-10.5	1150-1900
V18A	185	210	4	18V	75-125	1000-1500	16-18	7.0-10.5	1300-2200
V18B	210	210	4	18V	96-158	1000-1500	16-18	7.0-10.5	1700-2850

## Isotta Fraschini

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Chesapeake, Va. 23320

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Email: [iso\\_to@fdgm.com](mailto:iso_to@fdgm.com)

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
L130672	130	142	4	6L	73.5	2400	19.5	11.36	300-440
V130872	130	126	4	8V	73.5	2700	18.25	11.34	330-550
V131272	130	126	4	12V	73.5	2700	19.5	11.34	495-880
V170872	170	170	4	8V	119.5	2000	18.5	11.33	700-955
V171272	170	170	4	12V	140	2000	21.7	11.33	1050-1680
V171672	170	170	4	16V	147	2100	21.7	11.9	1730-2350

## MaK Motoren GmbH & Co.

Falkensteiner Str. 2

Kiel D-24159 Germany

Tel: 011-49-431-399501

Fax: 011-49-431-3995-157

## MaK Americas Inc.

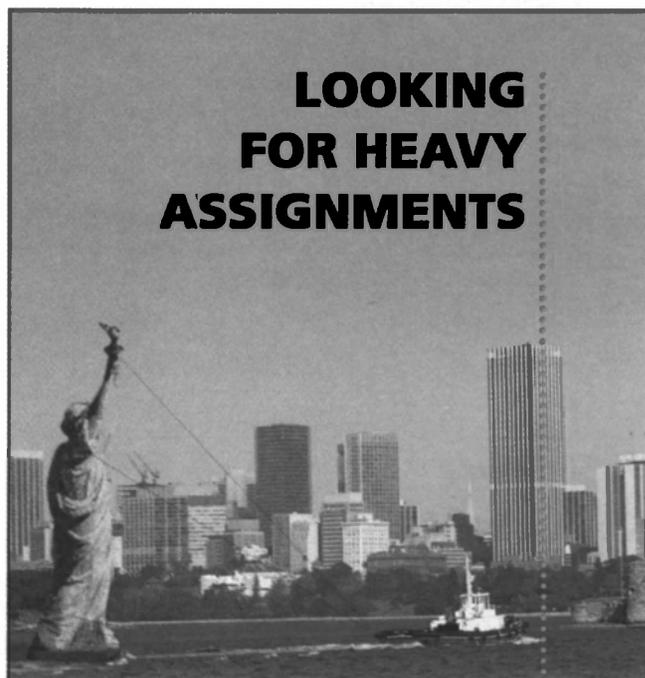
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(Continued on page 74)



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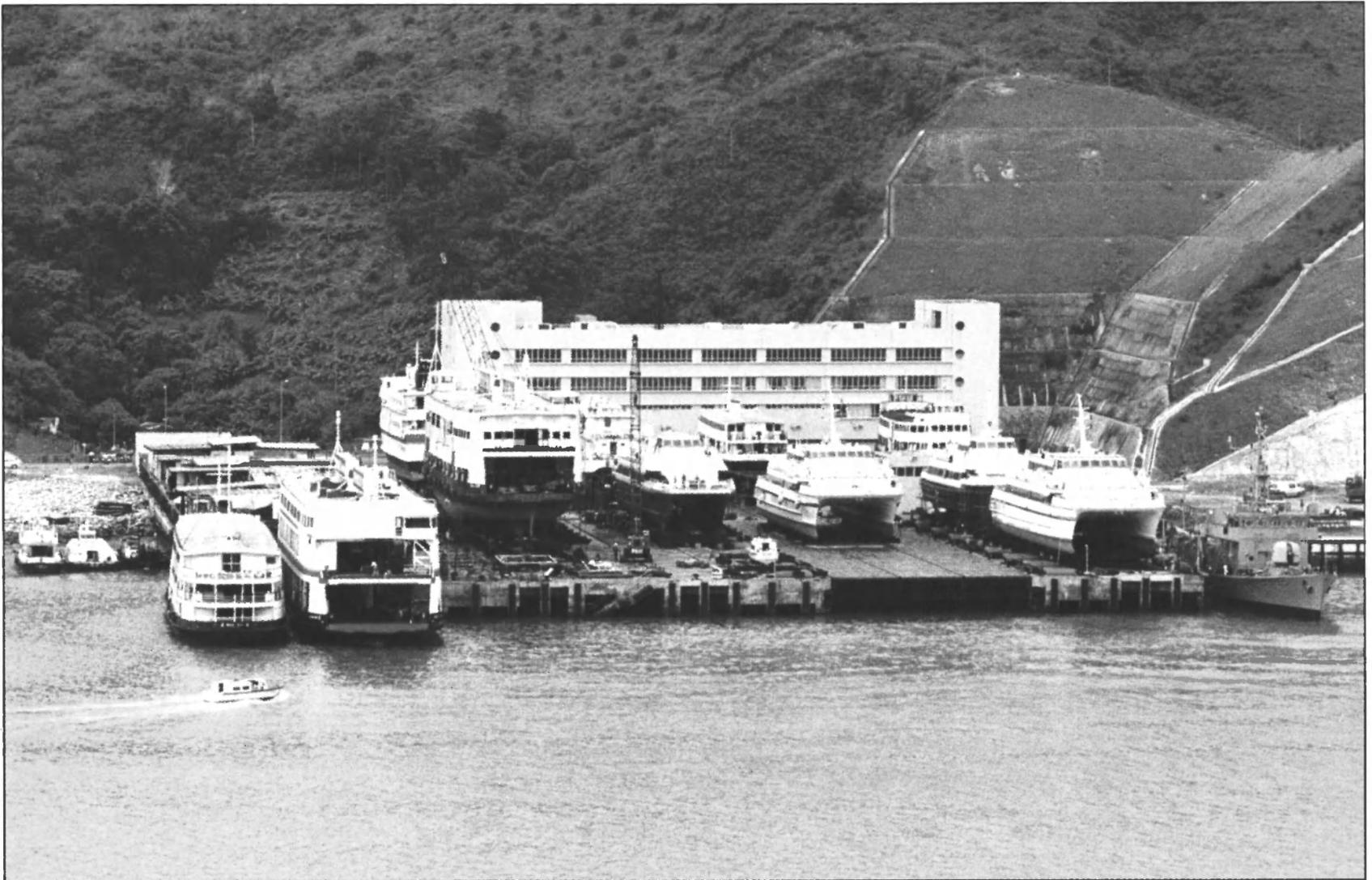


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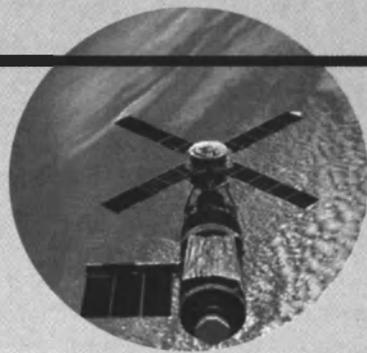
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# Wherever You May Roam

Despite some stumbles getting off the ground, the new era of satcom promises to make shipping more safe, efficient and profitable



**S**erious advances in the ability to communicate while at sea are quickly changing the quantity and quality of information able to be received and utilized by ships and boats. The dawn of yet another new era is upon the industry, with three major satellite communication players — Iridium, Globalstar and ICO — are prepared to raise the bar a notch further.

While vessel owners have been besieged with fast advancing technologies on many fronts in recent years, steps forward in the ability to effectively communicate via voice, data, fax and e-mail are seen as being increasingly important in ensuring a vessel's efficiency and safety.

The major trends in satellite communications technologies closely mirror those in other walks of technology, in that components are increasingly designed to not only save space, but to provide seamless operation in any given number of rigorous environments.

Such is the case with Iridium, Globalstar and ICO, all of which currently or plan to offer portable and fixed vessel communication products which are designed to minimize space and weight. The technology and systems offered by the three, though, is hardly limited to the confines of larger vessels. Indeed, the millions of smaller vessels which ply the world's

inland and coastal waterways are all potential users of the new technology.

## First out of the Gate

While Iridium World Communications were the first — and currently only — provider of the global satellite-telephone network, the service has not been without problems. Iridium — which combines terrestrial cellular and satellite communications in a portable handset — has encountered lower-than-anticipated membership and perception problems regarding the pricing of its service. While competitors have been quick to bury Iridium for the initial hiccups, it is apparent that the pioneer in the global satellite-telephone network has a solid plan and system for long-term growth and prosperity.

First, it seems wholly irrational that Iridium, which is 18-percent owned by the deep pockets of technology leader Motorola Inc., and has invested billions in the creation and deployment of its 66 satellites into Low Earth Orbit (LEO) — would throw in the towel at an early stage. With the era of true global satellite communications just dawning, Iridium is counting on the maritime industry as a major plank in its business platform, based on the unique service requirements and potential usage levels of the international marine market.

The size of the Iridium handset is able to be so small — as compared to current satcom systems currently installed aboard ships — due to the close proximity of its satellites to earth. Circling at an altitude of just 780 km, the Iridium network allows for a tightly focused beam to be sent to earth, which in

turn is designed to provide for a stronger signal.

The dual nature of the equipment — specifically its compatibility with mobile cellular standards — will help to make communications more cost-effective when a vessel or user is in position to access these services. Iridium reverts to a standard cellular phone capability whenever in range of shore.

In a recent attempt to boost service and its flagging stock price, the company reported in late July that it plans to cut prices for its service by as much as 65 percent and introduce a flat rate for international customers. Domestic phone calls will cost \$1.50 to \$2.50 a minute, and international calls will be \$3 a minute. Iridium also announced that Motorola and Kyocera Corp., which make the phones for its service, will cut prices on phones, pagers and other accessories. Satellite phones will sell for less than \$1,000, down from as much as \$3,000. The new rates will be effective July 1.

## ICO makes Waves

ICO, scheduled to be the third system up, scheduled to initiate service in mid-2000, has given a large amount of consideration to smaller vessel usage as a target of its technology. In cooperation with a host of top echelon maritime product and service companies, ICO is offering a compact satellite communications system that is roughly based on cellular units in terms of size and appearance. While ICO will be the last of the three to start service, Gary Maughan sees this as an advantage rather than a detriment.

When the company does finally throw the "on" switch, it will have invested an estimated \$4.5 billion. Maughan reasons that the satellite communications business is a long-term one, and that, in the end, it is reliability, quality and pricing that will gain and retain cus-

**Iridium, which was first to market with its satellite navigation system, has fought lower-than expected membership numbers with service and equipment price cuts. The company, with a sophisticated system of 66 LEO satellites and the backing of technology leader Motorola, has devised a long-term plan for top-quality service and prosperity.**

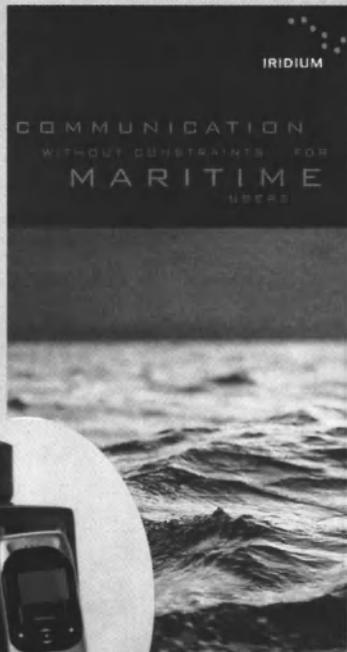
tomers. "I think it is good to be third in this race," he said.

The company strategically announced a teaming with NERA, a move designed to add an expert maritime manufacturer to create the hardware elements of its service. According to ICO's commercial manager, Qiaogen Shan, the small size and wide functionality of the handheld unit is key to achieving market penetration in the smaller vessel segment. For example, the company is keen to tap the fishing vessel market, where the company estimates there are a potential five million plus users on the world's fleet of 1.2 million vessels.

ICO, which had signed a contract with Nera last October for the delivery of \$25 million of handset marine communication terminals, announced a new boat kit at the recent NorShipping event held last month in Oslo. The boat kit is a maritime communicator station that is designed to function via the ICO satellite constellation. Designed by Nera, it will be able to access any telephone, fax or e-mail from any point on the earth. The new unit is designed for dual mode.

## Globalstar aggressive approach continues

Globalstar has maintained its aggressive launch schedule, recently sending an additional four LEO satellites into space, bringing the total number of Globalstar satellites that have been successfully launched to 24. Globalstar needs two more launches to have the coverage



needed to start its regional roll-out of service — service it plans to start in September. Increased system testing is the primary reason Globalstar adjusted its launch schedule in April, accelerating a previously procured Delta II from early November. Upon completion, the 48-satellite constellation orbiting at 1,414 kilometers (877 miles) will provide full system capacity and redundancy, backed up by an additional four on-orbit spares. The Globalstar system is designed to provide affordable satellite-based digital voice services. Globalstar, led by founding partner Loral Space & Communications, is a partnership of the leading telecommunications service providers and equipment manufacturers, including Qualcomm Inc., AirTouch Communications, Alcatel, Alenia, China Telecom (HK), DACOM, Daimler-Chrysler Aerospace, Elsacom (a Finmeccanica Co.), France Telecom, Hyundai, Space Systems/Loral and Vodafone.



Although ICO is not due to initiate service until the middle of 2000, the company has aligned itself with maritime powerhouse NERA — among others — to deliver a compact, easy to use line of communicators.



For more information	
Iridium	Circle 153
Globalstar	Circle 154
ICO	Circle 155

# Satellite Communications

## EU Examines SatNav System

Not enamored with depending on the U.S. and Russia for satnav capabilities, the European Union (EU) recently earmarked \$82.5 million for development of its own next-generation satellite navigation system, the Galileo project. The funds are to be used to set the technical parameters for the system, examine the availability of private sector finance and begin cooperation with the U.S. and Russia, whose own satellite systems will be rivaled by Galileo. Galileo — or the Global Navigation Satellite System — could eventually be used for everything from tracking stolen vehicles to ensuring air safety to managing road charging systems. Acting EU Transport Studies into the organizational and technical aspects of Galileo are due to be completed late in 2000 or early in 2001, and a final decision on the project is due shortly thereafter.

## MTN Signs Exclusive Contract With AT&T

Maritime Telecommunications Network (MTN), a subsidiary of ICG Satellite Services, signed an exclusive seven-year lease agreement with AT&T to provide C-Band equipment including antennas, stabilized platforms and terminal services to be used on U.S. Navy ships around the world. The new agreement extends MTN's previous contract with AT&T and will include the installation of at least 15 APTS systems on board military ships. The MTN system enables sailors to utilize their AT&T Calling Cards to make calls from anywhere in the world. The lease agreement allows renewal options, which will grant AT&T the ability to continue service throughout the term of the APTS Program's life.

## First Center for Official ENC's Is Open

PRIMAR is the very first Regional Coordinating Centre for Official Electronic Navigational Charts with an Operational ENC Service available from July 1999. PRIMAR, which is located in Stavanger, Norway, has been established on behalf of the participating Hydrographic Offices within Europe to integrate and supply their Official ENCs to the international shipping industry. The operators of PRIMAR are the Norwegian Mapping Authority, through its ECC (Electronic Chart Centre), and The United Kingdom Hydrographic Office.

The PRIMAR Service will be sold only through a network of authorized distributors. Ships and other users will be able to receive electronic chart data and updates via CD-ROM, Inmarsat, ISDN or GSM. The ENCs delivered by PRIMAR will be fully compliant with IMO and IHO standards so that they may be used legally to navigate any ship, including those subject to the IMO SOLAS convention, when used within an approved ECDIS.

Circle 151 on Reader Service Card

## Comsat Wins Five Year Navy Contract

Comsat recently won a satellite services contract from the U.S. Navy, with a maximum value of \$111.9 million over a five year period. Comsat will provide global satellite service over Inmarsat for 64 kbps high-speed data, along with voice and multimedia communications. These services will be provided to any of the Navy's deployed battlegroups and their associated Marine amphibious readiness groups, and include ship-to-shore, ship-to-ship and shore-to-ship communications.

Circle 148 on Reader Service Card

## Globe Communications Center Introduced

Globe Wireless, a communications service provider offering communications for the maritime industry, recently introduced the Globe Communications Center, designed as a one-stop ship for communication needs onboard vessels. With the new center, onboard personnel have a single interface that handles all messaging and data transfer. The user simply addresses and types the message, attaches a data file and clicks the Send button.

Having recently merged with Marinet Systems, Globe Wireless now has expertise to deliver products incorporating the best of satellite and HF. Together, the companies provide services to more than 2,800 vessels, have operations in 16 countries and sales offices and agents in 15 countries. Marinet was a pioneer in the introduction of e-mail and data communications to the maritime industry using Inmarsat services more than 10 years ago.

Circle 147 on Reader Service Card

## Sailor Iridium System: World's Smallest Satellite Terminal

S.P. Radio A/S has followed through on delivering communications innovation. At the recent NorShipping exhibition, the company was presenting a live Sailor Iridium Single Channel and a live Sailor Iridium Multi Channel, making it possible to make calls from the Sailor Iridium equipment. The Sailor Iridium system is reportedly the world's smallest satellite terminal, with a minimal sized aerial to allow installation on the smallest commercial vessels.

Circle 146 on Reader Service Card

## BT Unveils Innovative Sat Service

British Telecom launched a new satellite ser-



# SAILOR

## SALES AND SERVICE AGENTS

- ANTILLES (NETHERLANDS)**  
Radio-Holland Caribbean N.V. - Curacao N.A.  
Phone: +599 94 612577 - Fax: +599 94 612723
- ARGENTINA**  
SEN S.R.L. - Buenos Aires  
Phone: +54 1 361 1496 - Fax: +54 1 361 2606
- AUSTRALIA**  
Rubin Group Pty Limited - Arlarmen NSW  
Phone: +61 2 94392333 - Fax: +61 2 94392278  
a.m. sales - O'Connor, Western Australia  
Phone: +61 89 337 3266 - Fax: +61 89 314 2929
- BAHRAIN**  
Aeradio Technical Services - Mina Salman Port  
Phone: +973 727790 - Fax: +973 727811
- BANGLADESH**  
Graphics Communications Ltd. - Dhaka  
Phone: +880 2 89 2440 - Fax: +880 2 883627
- BELGIUM**  
Antwerp Marine Radio Company N.V. - Antwerp  
Phone: +32 3 202 0499 - Fax: +32 3 202 0493
- BRAZIL**  
O.L. Naval Ltda. - Rio de Janeiro  
Phone: +55 21 509 8667 - Fax: +55 21 242 7934
- BULGARIA**  
International Marine Technologies Ltd. - Rousse  
Phone: +359 82 228216 - Fax: +359 82 822230
- CANADA**  
Radio Holland (Canada) Ltd. - North Vancouver  
Phone: +1 604 293 2900 - Fax: +1 604 293 2930
- CHILE**  
Serprotec Ltda. - Valparaiso (Deep Sea)  
Phone: +56 32 232780 - Fax: +56 32 212215  
Sirrad S.A. - Santiago (Fishing)  
Phone: +56 2 235 1068 - Fax: +56 2 235 6732
- COLOMBIA**  
Electronica Maritima Ltda. - Cartagena  
Phone: +575 663 3789 - Fax: +575 663 3643
- CROATIA**  
BELAM-Zastupstvo I Servis - Rijeka  
Phone: +385 51 672343 - Fax: +385 51 672179
- CYPRUS**  
A. P. Hadjipieros Ltd. - Limassol  
Phone: +357 5 345972 - Fax: +357 5 345973
- ECUADOR**  
Industrial Anabra C. Ltda. - Guayaquil  
Phone: +593 4 308766 - Fax: +593 4 313694  
Nautical del Ecuador - Manta  
Phone: +593 5 628900 - Fax: +593 5 628910
- EGYPT**  
Suez Electronics Engineering & Trading Ltd. - Cairo  
Phone: +20 2 2742911 - Fax: +20 2 2745219
- ESTONIA**  
A/S RSTÄ - Tallinn  
Phone: +372 6 312082 - Fax: +372 6 312082
- FAROE ISLANDS**  
S.P. Radio A/S - Denmark  
Phone: +45 96 34 61 00 - Fax: +45 96 34 61 01  
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Phone: +358 9 435 5670 - Fax: +358 9 435 56710  
Navitec Oy - Helsinki  
Phone: +358 9 700 17 80 - Fax: +358 9 179 830
- FRANCE**  
Goslink - Roquevaire  
Phone: +33 4 42 32 99 00 - Fax: +33 4 42 32 94 95  
SDM Electronique - Sartrouville Cedex  
Phone: +33 1 39 146833 - Fax: +33 1 39 133022
- GERMANY**  
Ena GmbH - Rellingen/Hamburg  
Phone: +49 4101 30100 - Fax: +49 4101 301214
- GIBRALTAR**  
Electro Med - Marina Bay  
Phone: +350 77077 - Fax: +350 72051
- GREECE**  
Marac Electronics S.A. - Perama - Piraeus  
Phone: +30 1 43 14361 - Fax: +30 1 43 14234
- GREENLAND**  
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Phone: +31 10 4283344 - Fax: +31 10 4281498  
Sailtron B.V. - Utrecht  
Phone: +31 30 2840850 - Fax: +31 30 2837642
- HONG KONG**  
Radio Holland B.V. - Kwai Chung N.T.  
Phone: +852 24239007 - Fax: +852 24805898  
Hoi Tung Communication & Navigation Co. Ltd  
Phone: +852 25421262 - Fax: +852 25431137
- ICELAND**  
Radiomidud Ltd. - Reykjavik  
Phone: +354 511 1010 - Fax: +354 511 1020
- INDIA**  
Elcome Marine Services Pvt. Ltd. - New Bombay  
Phone: +91 22 762 91 26 - Fax: +91 22 762 91 50
- INDONESIA**  
PT Panorama Timur Jaya - Jakarta  
Phone: +62 21 475 6788 - Fax: +62 21 475 1688
- IRAN**  
Kaman Hormozgan Marine Engineering - Tehran  
Phone: +96 21 222 8020 - Fax: +96 21 222 4502
- ISRAEL**  
Alhout-Yam Ltd. - Haifa  
Phone: +972 4 86 20804 - Fax: +972 4 8627404
- ITALY**  
Compagnia Generale Telemar - Roma  
Phone: +39 063 221 800 - Fax: +39 063 240 148  
Generalmare est S.R.L. - Chiavari  
Phone: +39 0185 323 356 - Fax: +39 0185 322 731
- IVORY COAST**  
Nautical Afrique - Abidjan  
Phone: +225 250136 - Fax: +225 250137
- JAPAN**  
Kagai Gijyutsu K.K. - Yokohama  
Phone: +81 45 6647318 - Fax: +81 45 6647320
- KOREA**  
Sanyang Radio Co. Ltd. - Pusan  
Phone: +82 51 413 5000 - Fax: +82 51 413 5002  
Turn-On Electronics Company - Pusan  
Phone: +82 51 462 3830 - Fax: +82 51 462 3089
- KUWAIT**  
Elcome International - Safat  
Phone: +965 2406822 - Fax: +965 2406833
- LATVIA / LITHUANIA**  
Transas Marine Baltia - Riga  
Phone: +371 7285585 - Fax: +371 7821202
- LEBANON**  
Selmar Electronics S.A.R.L. - Beirut  
Phone: +961 1 491 489 - Fax: +961 1 495 325
- MALTA**  
Medcomms Ltd. - Gzira  
Phone: +356 335521 - Fax: +356 310820
- MOROCCO**  
Sorem Casa - Casablanca  
Phone: +212 2 442802 - Fax: +212 2 305385
- NAMIBIA**  
Radio Electronic c.c. - Walvis Bay  
Phone: +264 64 207 489 - Fax: +264 64 206 916
- NEW ZEALAND**  
Wrights Ltd. - Wellington  
Phone: +64 4 568 8975 - Fax: +64 4 568 8361
- NIGERIA**  
Netarcomms Nigeria Ltd. - Lagos State  
Phone: +234 1 470 2959 - Fax: +234 1 545 2376
- NORWAY**  
SAILOR Norge as - Oslo  
Phone: +47 22 89 7875 - Fax: +47 22 89 7804
- SULTANATE OF OMAN**  
Elcome International - Muscat  
Phone: +968 788 332 - Fax: +968 788 331
- PAKISTAN**  
International Aeradio Pakistan (Pvt) Ltd. - Karachi  
Phone: +92 21 5837800 - Fax: +92 21 5837031
- REPUBLIC OF PANAMA**  
Provedora Tecnica, S.A. - Panama  
Phone: +507 227 3533 - Fax: +507 227 1053
- POLAND**  
EPA Ltd. - Szczecin  
Phone: +48 914 874 885 - Fax: +48 914 875 014
- PORTUGAL**  
Neutel - Electronica Maritima, Lda. - Lisbon  
Phone: +351 1 39 20 940 - Fax: +351 1 39 20 949
- QATAR**  
Eastern Technical Services Co. - Doha  
Phone: +974 477412 - Fax: +974 478282
- RUMANIA**  
Imsat Maritime SA Constanta - Constanta  
Phone: +40 41 639038 - Fax: +40 41 674356
- RUSSIA**  
Transas Marine Ltd. - St. Petersburg  
Phone: +7 812 325 3131 - Fax: +7 812 567 1901  
Moretron Ltd. - Murmansk  
Phone: +47 85 10144 - Fax: +47 85 10144
- SAUDI ARABIA**  
Key Communications Development Ltd. - Dammam  
Phone: +966 3 8336940 - Fax: +966 3 8330728
- SINGAPORE**  
Radio Holland Singapore - Singapore  
Phone: +65 6822218 - Fax: +65 6822430
- SOUTH AFRICA**  
Cape Maritime Electronics (Pty) Ltd. - Cape Town  
Phone: +27 21 551 3204 - Fax: +27 21 551 3206  
Radio Holland Group - Paarden Eiland (Cape Town)  
Phone: +27 21 511 0864 - Fax: +27 21 511 7577
- SPAIN**  
Nautical - San Sebastián de los Reyes (Madrid)  
Phone: +34 91 6549411 - Fax: +34 91 6549600
- SWEDEN**  
Virgator Marine AB - Askim/Göteborg  
Phone: +46 31 668400 - Fax: +46 31 683660
- TAIWAN R.O.C.**  
Unimax Electric Co., Ltd. - Kaohsiung  
Phone: +886 7 815 9775 - Fax: +886 7 815 1775
- THAILAND**  
A. & Marine Co., Ltd. - Samutprakarn  
Phone: +66 2 703 5544 - Fax: +66 2 703 55 25
- TUNISIA**  
Alcatel Tunisie - Tunis Cedex  
Phone: +216 1 717177 - Fax: +216 1 719888
- TURKEY**  
Elektro-Deniz Ltd. - Istanbul  
Phone: +90 216 392 77 29 - Fax: +90 216 392 80 18
- UNITED ARAB EMIRATES**  
Elcome International L.L.C. - Dubai  
Phone: +971 4 342333 - Fax: +971 4 342465
- UNITED KINGDOM**  
Ships Electronic Services Ltd. - Rochester (Kent)  
Phone: +44 1634 295500 - Fax: +44 1634 295536
- URUGUAY**  
Electromartima Uruguay Ltd. - Montevideo  
Phone: +598 2 924 77 89 - Fax: +598 2 924 71 38
- USA**  
Radio-Holland USA, Inc. - Houston (Texas)  
Phone: +1 713 943 3325 - Fax: +1 713 943 3802
- VENEZUELA**  
Radio-Holland De Venezuela S.A. - Maracaibo  
Phone: +5861 987811 - Fax: +5861 982596

## NEW PRODUCT

### New KVH Tracphone Crew Calling (TCC) Concept

The new Tracphone Crew Calling (TCC) concept — introduced at NorShipping '99 — is designed to offer a cost-effective solution to operators seeking to improve communication efficiency while reducing costs. The Tracphone Crew Calling (TCC) concept is based on using the professional KVH Tracphone 50 system, which uses the Inmarsat mini-M spotbeam satellite communication service to provide almost worldwide voice communication. The Tracphone 50 is reportedly proven to be attractive to high seas vessels because of its extended range in the fringe spotbeam areas. In principle, the TCC may be based on one of three concepts: Prepaid SIM-Card; Prepaid Scratch Card or Payphone.



Circle 150 on Reader Service Card

vice — BT Best — which allows customers to transport heavy data applications between sites in a cost-effective manner.

BT Best allows customers to transfer large quantities of data or multimedia applications and pay for the leased service only while capacity is in use. For example, it may be an attractive option for cruise and ferry operators that may want to offer services such as video games on demand.

Circle 145 on Reader Service Card

### Inmarsat Offers ISDN Services

Earlier this year, Inmarsat introduced new capabilities to support 64 Kbps ISDN-compatible communications using new portable units the size of a notebook computer. The mobile units are being manufactured by Nera, Thrane & Thrane and STN Atlas Elektronik, and are scheduled to be available later this year. Among the many solutions the new service will offer are: image transfer by Fuji, e-mail by TNI, video confer-

encing by Toko, remote LAN access by Sterling Commerce and e-commerce/Intranet by Brand Comm.

Circle 144 on Reader Service Card

### Station 12 Offers Pay SatPhone

The Pay SatPhone from Station 12 can be easily connected to the second voice port of an Inmarsat mini-M or an Inmarsat-B terminal, allowing the terminal to be used simultaneously for business and personal usage.

The Pay SatPhone also offers a logistical improvement to handling personal phone usage onboard ships, eliminating the need to review itemized bills for proper charging. Cards can be sold or given to staff, and personal calling immediately becomes a more practical program to administer.

Circle 143 on Reader Service Card

### ARCOMS Expands Business Base

Advanced Remote Communications Solutions Inc. (ARCOMS) — which was previously known as BOATRACS — recently signed a Letter of Intent with Innovative Communications Technologies (ICTI). ARCOMS contemplates acquiring 100 percent of the outstanding stock of ICTI, which is engaged in the design and implementation of bandwidth efficient multimedia satellite networks.

BOATRACS provides worldwide communications solutions for the commercial marine industry, offering satellite communications and e-mail between vessels at sea and base stations on land, or with other vessels, oilrigs and platforms.

Circle 142 on Reader Service Card

### New Telex Messaging Service

Dataworks and BT have joined forces to offer SureSat, a telex messaging service operating via C-Sat and the Internet. Uniquely, the service delivers message status reports, including confirmation of receipt.

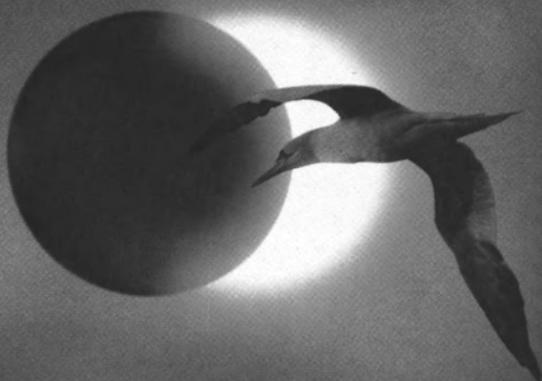
Circle 141 on Reader Service Card

### SeaLink2000 Keeps Shipbuilders Connected

SeaLink2000 is a collaborative Internet enterprise that facilitates the shipbuilding community's access to current product cost, engineering and logistics supportability data. Partners, including the Naval Sea System Command, the American Bureau of Shipping and the Naval shipbuilding community and more than 3,000 OEMs help to make the system a valuable informational tool. SeaLink's functionality is diverse, as it can provide specific information on manufacturers which, for example, meet Navy requirements for propulsion plants, pumps and compressors. It can also provide product performance information, and provides the capability to calculate life cycle costs.

Circle 140 on Reader Service Card

A wide horizon is a privilege, not a right



## SAILOR SATELLITE SYSTEMS

A breakthrough in communication



Sailor has a long history as a leading manufacturer and supplier of satellite communication systems. Our products are sold as both stand alone products and as integrated units in our highly regarded GMDSS solutions.

With the latest SAILOR SP4400 SAT-B, Sailor has untangled the Gordian knot of satellite technology.

It is a flagship among digital Ship Earth Stations (SES) and a breakthrough in maritime aerial technology, transmission speed, quality and reliability.

Sailor has always aimed for new horizons. When we have planned an innovative course for the future we

follow it. SAILOR SP4400 is the result of this highly visionary development strategy.

Today, nearly 10% of our annual turnover is invested in product research and development and more than one in ten of S.P. Radio's employees is involved in projects facing the challenges of tomorrow.

**SAILOR**  
When safety counts

S.P. RADIO A/S · Porsvej 2 · DK-9200 Aalborg SV · Denmark · Phone. +45 9634 6100 · Fax +45 9634 6101  
Telex 69 789 SPRAD DK · E-mail: sailor@sailor.dk · Web: www.sailor.dk

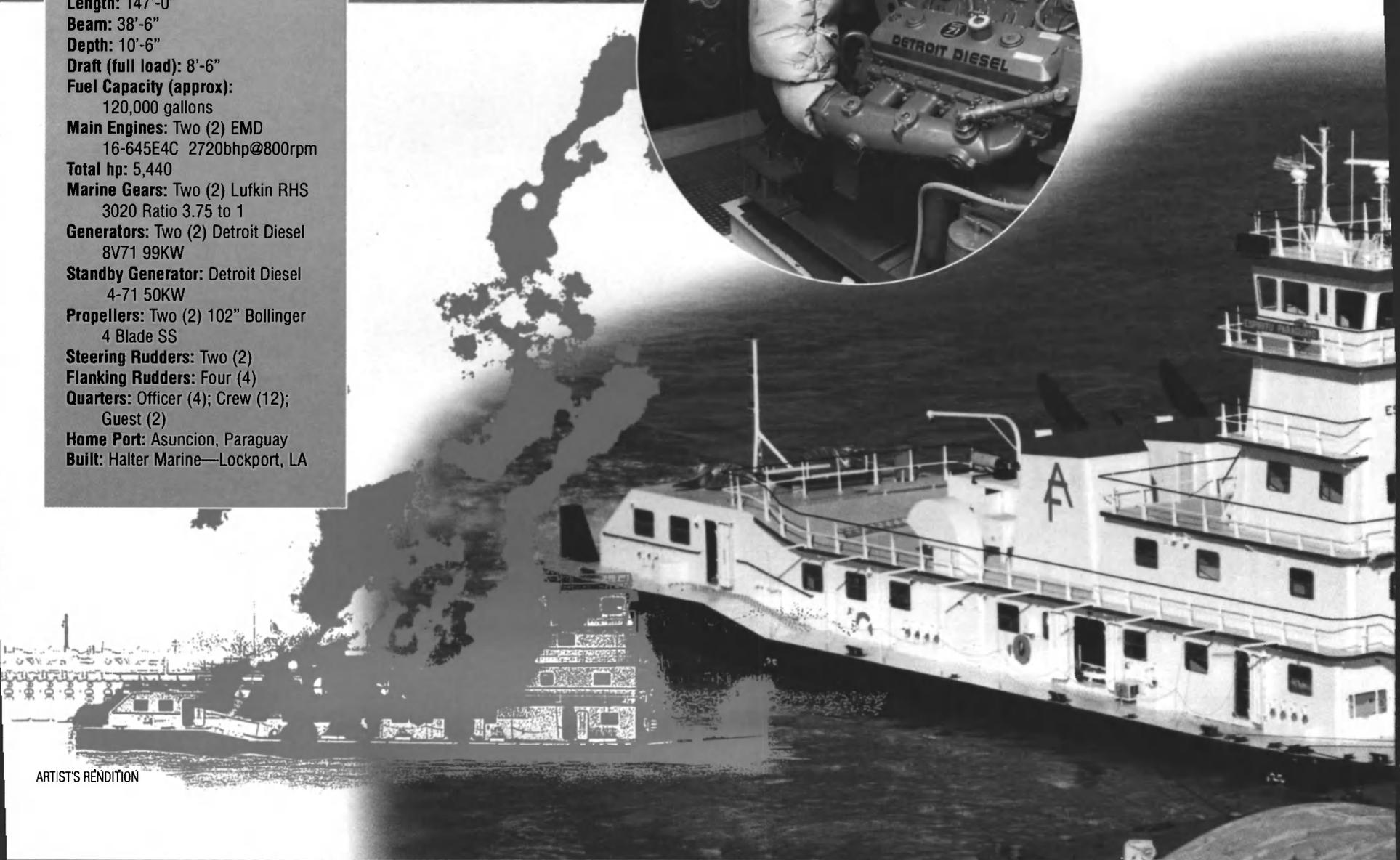
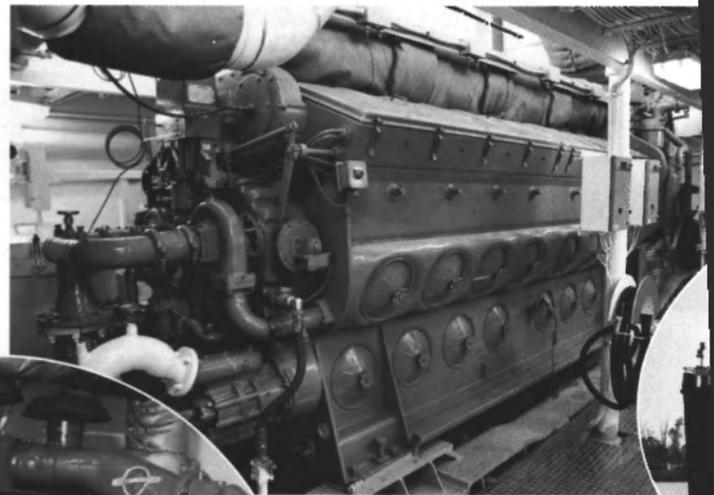
# Out of the Ashes

## Burned out hull get

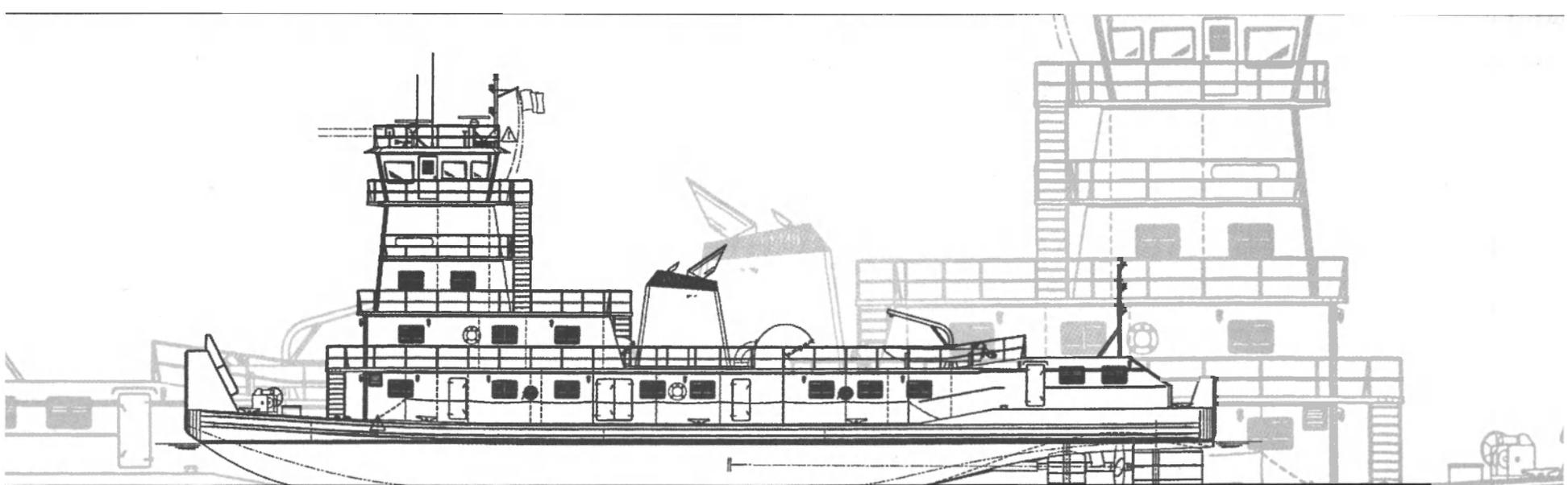


### **M/V ESPIRITU PARAGUAYO (PARAGUAYAN SPIRIT)**

**Length:** 147'-0"  
**Beam:** 38'-6"  
**Depth:** 10'-6"  
**Draft (full load):** 8'-6"  
**Fuel Capacity (approx):**  
120,000 gallons  
**Main Engines:** Two (2) EMD  
16-645E4C 2720bhp@800rpm  
**Total hp:** 5,440  
**Marine Gears:** Two (2) Lufkin RHS  
3020 Ratio 3.75 to 1  
**Generators:** Two (2) Detroit Diesel  
8V71 99KW  
**Standby Generator:** Detroit Diesel  
4-71 50KW  
**Propellers:** Two (2) 102" Bollinger  
4 Blade SS  
**Steering Rudders:** Two (2)  
**Flanking Rudders:** Four (4)  
**Quarters:** Officer (4); Crew (12);  
Guest (2)  
**Home Port:** Asuncion, Paraguay  
**Built:** Halter Marine—Lockport, LA



ARTIST'S RENDITION



# new power, new life, new mission

## Ten Years Ago,

the towboat **Senator Eastland** burned on the Arkansas River. After the fire, the hull was towed away, the deckhouse and machinery were removed, and the hull was painted and stored.

Flash forward to 1997. Stewart & Stevenson purchased the old hull, together with new rudders and propeller shafts, and the old propellers. S&S concluded it could rebuild and repower the vessel as a 5400 H.P. towboat.

S&S subcontracted with Halter Marine, Inc. to do a detailed design and to repair the hull, then complete the boat like an all new boat. The hull was towed to Halter Gulf Repair in New Orleans, a Halter repair yard, where it was dry-docked. Audio gauge readings of the hull showed the hull to be in like new condition.

So work began. The gridcooler boxes were changed or added, and the generator channel coolers were lengthened. New bearings, sea chests, a water maker and strut barrels were installed. The propeller shafts were installed and a new pair of stainless steel, four-blade propellers with 90% developed area ratio were installed. New rudders and new Fernstrum grid-coolers were installed, and the hull was sandblasted and painted. The hull was re-floated and towed to Halter Marine, Inc. in Lockport, Louisiana.

While the hull was at Halter Gulf Repair for three months, work was proceeding on the deckhouses at Lockport. When the hull arrived, the interior was prepared for some changes and the machinery was

installed. A pair of Lufkin Model RHS 3020 reverse-reduction gears in ratio of 3.75 to 1 were installed, then a pair of remanufactured EMD 1 6-645EC turbocharged engines were installed to produce 2720 hp each at 800rpm. Two Detroit Diesel 8V71N, 115 KW generator sets were installed.

Renamed **Espiritu Paraguayo** (Paraguayan Spirit), this new vessel has high horsepower and generous crew capacity. It will operate on unmarked river sections with no shore electricity available, where it must lay over at night. The deckhouse is unusually tall (49 feet eye level) to provide the greatest viewing advantage. This is possible because there are no low bridges where the boat will be in operation. As might be expected, redundant fire control features are in place as well.

Following sea trials in March, 1999, the vessel was loaded onto a semisubmersible boat for transportation to Paraguay.

Stewart & Stevenson is delivering it to Navegacion Paraguaya Americana, S.A., a company affiliated with the South American barge line ventures of Allen Mott. This is the third towboat purchased by Mott from S&S, and the fourth towboat powered by Electro-Motive Division of General Motors (EMD) engines by S&S for Mott and Associates.

Stewart & Stevenson engines were chosen to power these new vessels because our DDC and EMD engines have given many years of

reliable service at home and abroad. Let us show you how S&S can provide economical and reliable power to bring new life to your vessel.

### Coverage to spare

S&S offers engineering and sales in 26 U.S. States and 28 foreign countries, including all the Caribbean Islands.

- EMD/DD SALES & SERVICE
- EMD SALES & SERVICE
- DD SALES & SERVICE
- EMD SALES ONLY



#### NEW ORLEANS BRANCH

1400 Oestrehan Ave., Harvey, LA 70058  
(504) 347-4326 • Fax: (504) 348-8970

#### HOUSTON BRANCH

8631 East Freeway, Houston, TX 77029  
(713) 671-6100 • Fax: (713) 671-6197

Circle 294 on Reader Service Card

# Deck Machinery & Cargo Handling Equipment

## Norent Shore Ramp Helps Reduce Turnaround Times

With three new vessels, the Swedish forest products group, Stora, plans to introduce a new transport system in late 1999 that will contribute to the enlargement of the export volume for forest products from Sweden through the



shortest possible turnaround times in the harbor for the vessels, and in order to optimize the cargo handling procedures in the harbor of the Stora Big Boxes, the

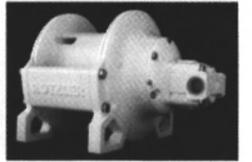
A l v s - borgshamnen in Goteborg. To meet the

transport between the vessel and the quay will be handled via a shore ramp to be delivered by Goteborg-based Norent AB. The system consists of one access ramp and one egress ramp, both connected to a horizontal platform. A movable hydraulic ramp rests on the vessel and allows direct access upper decks.

Circle 4 on Reader Service Card

## Rotzler's Hydraulic Winch

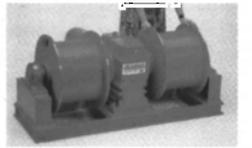
Rotzler's Model TH3 Planetary Hydraulic Winch is the newest member of its Titan series. With a bare drum pull of 7,250 lbs. at line speed of 148 fpm, based on 2,500 psi at 40 gpm, the TH3 can accommodate 268 ft. of .563 in. wire rope.



Circle 30 on Reader Service Card

## New Double Drum Winch Line

Jeamar has introduced a new line of double drum winches. An extensive range of sizes is available with line pulls from 500-40,000 lb. line pull. This new line can be supplied with extended drum centers to conform to client's requirements.



Circle 31 on Reader Service Card

## Timberland Winches

Timberland supplied four Model A1600-1-1H winches, complete with diesel-hydraulic power units to Versatruss America, LLC. The Versatruss lifting system is designed to lift as much as



20,000 tons in one operation using a matched pair of barges rigged with lifting booms, winches and other standard marine equipment. The custom-made booms are connected to each side of the object to be lifted (in this case, for each of three decks being installed for Chevron). The jacket is then lifted by pulling the trusses together, with the 80T winches, increasing the angle of inclination of the booms and raising the jacket.

Circle 32 on Reader Service Card

## Pullmaster: Recognized Leader

Pullmaster Winch Corporation is known for the manufacturing of hydraulic planetary winches and drives. With more than 30 years experience, the company has kept in tune with all technological advances. Pullmaster's ISO 9001 QMS is registered to meet the applicable national and international standards. Both hydraulic planetary winches and drives are available with a comprehensive range of options. Winches come with a bare drum line pull range of 1,100 to 50,000 lbs., while the "Planematic" range of hydraulic planetary drives provide an output torque range of 50,000 to 136,000 lb.-in.

Circle 60 on Reader Service Card



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Circle 27: on Reader Service Card

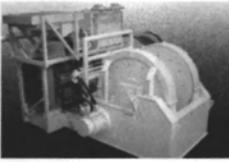
## Deck Machinery & Cargo Handling Equipment

### Anchor-Handling/Towing Winch

The Model FCSL 150W/1D anchor-handling/towing winch, built by Fritz Culver, Inc., is a single drum, hydraulically driven winch. The winch uses two large Hydrex motors driving the drum directly through pinion gears to a large

bull gear on each flange. The drum is driven directly by the motors and does not contain a clutch.

Failsafe brakes are mounted on each hydraulic motor. The pumps and motors are rated at 5,000 psi, while the operat-



ing pressure is 3,500 psi. The HPU requires 3,000 hp.

Circle 35 on Reader Service Card

### New Deck Equipment

OSL Offshore Systems & Deck Machinery, LLC has released a new line of deck equipment for the offshore drilling industry.

The products include jacking systems in both electric and hydraulic drive configurations, fully integrated PLC controls and field instruments to complement the overall design. Capacities range from a 1,000 KIPS per pinion for large jackup applications to 100 KIPS per pinion for the liftboat market. All systems feature a unique load sharing drive and monitoring subsystem.



Circle 36 on Reader Service Card

### MacGREGOR-Häggblunds Bulk Cranes

A second 13,200 dwt geared bulk carrier ordered by Finnish shipowner ESL features a repeat order for MacGREGOR-Häggblunds cranes as well as MacGREGOR hatch covers. Another shipset of three bulk cranes from MacGREGOR-Häggblunds' Ornskoldsvik factory has been delivered to the Aker Finnyards shipyard in Finland. The cranes are being installed on the 13,200 dwt geared bulk carrier building for leading Finnish dry bulk shipowner Etela-Suomen Shipping (ESL), which also features a repeat order for MacGREGOR Foldtite-type hatch covers.

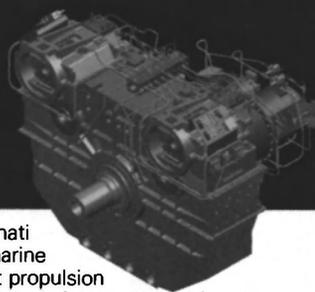
Three MacGREGOR-Häggblunds electro-hydraulic type K2524 cranes are included in the shipset, each having a capacity of 25 tons and fitted with a 12.5 cu. m. grab.

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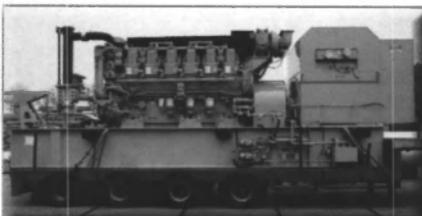
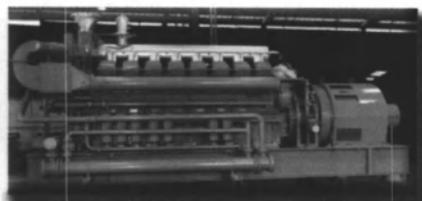
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Circle 210 on Reader Service Card

### Schoellhorn-Albrecht Introduces Newest Of Capstan Series

Schoellhorn-Albrecht of St. Louis has presented the newest member of its high performing Capstan series.

Model SA1014-30E features a 30-hp motor with 40,000 lbs., starting pull 20,000 lbs.



running pull at 35 fpm. Schoellhorn-Albrecht capstans are constructed to withstand severe operating conditions with minimum maintenance. Units are single or variable speed, with a choice of electric, hydraulic, pneumatic or manual prime movers. Electrical powered capstans feature marine duty "Crane & Hoist" design D motors for smooth starting under load, and 300 percent starting torque. Capstan options include special marine coating and explosion proofing for hazardous areas.

Circle 61 on Reader Service Card

## E-Crane From Ohio Locomotive Crane

The equilibrium crane, or E-Crane, features a reach of up to 125 ft., load-lifting capacities to 27.5 tons, push down ability equal to 50 percent of the rated capacity and significantly reduced power consumption and maintenance costs. Manufactured by Ohio Locomotive Crane Company, Inc., the E-Crane is designed for bulk material handling, storage and process feeding at ports and harbors.



Circle 38 on Reader Service Card

## Hydra-Pro Marine Cranes

Hydra-Pro's line of marine cranes, which include 14 styles of fixed cranes, 14 styles of knuckle cranes and 13 styles of telescoping cranes, are available in an assortment of specifications. The cranes range in ton capacity from one to 50. Up to an 80 ft. reach is available. The crane booms are made of HSLA steel, and all boom components are 100 percent seal-welded and watertight to prevent corrosion.



Circle 39 on Reader Service Card

## Oil States Industries To Expand

Adding to its growing list of subsidiaries, Arlington, Texas-based Oil States Industries has decided to expand its U.S. operations with the addition of CE Marine, Inc. The new company will be known as Oil States Skagit Smatco. The addition of Skagit Smatco — and its mooring systems, J-lay systems, pipe handling and racking systems — will significantly enhance its presence in the deepwater offshore sector.

Circle 46 on Reader Service Card

## NETEC Acquired By Jered Industries

NETEC, Inc., previously known as New England Trawler Equipment Com-

pany, has been acquired by Jered Industries. NETEC, which began as a trawl winch supplier to the New England fishing fleet, has grown into a well-known designer and manufacturer of a full line of commercial deck machinery. Products include: anchor windlasses and winches, capstans, mooring and towing winches. The company's most recent offering includes a line of specialized towing winches utilizing a proprietary

control system with a unique Emergency Abort System.

Circle 47 on Reader Service Card

## Markey Leaves Mark With High Profile Jobs

Markey Machinery produces custom deck equipment for workboat, research vessels, docks, and other custom marine equipment. Products include tow

winches, capstans, research winches, windlasses, mooring winches, traction winches, and hawser winches. Recent deliveries include VMS' Prince William Sound Class Tractor Tug Nanuq and Tanerliq, four new Hvide Marine Service's SDM MkII tractor tugs, and TMA Marine's Thad A. Current projects include hawser winches for Bisso Offshore, and deck equipment for VMS.

Circle 190 on Reader Service Card

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## SLM Corp. Introduces Millennium-2000 Capstans

Superior-Lidgerwood-Mundy Corp. has released the Millennium-2000 Capstans featuring the latest in high-performance right angle drives. Unlike some conventional worm gear Capstans, the Millennium-2000 is able to maintain a significantly high efficiency over a wide range of ratios, therefore enabling them to reflect greater pull for equal or less hp in many cases.

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Website: <http://www.icgcomm.com>

Beijing Marine Comm. and Navigation Co.  
1 Waighan Houshen, Beijing 100011 China  
Tel: 011-86-10-6429-3665  
Fax: 011-86-10-6421-3509

ICO Global Communications Services  
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Washington, D.C. 20036  
Tel: 202-887-8111; Fax: 202-887-0889

Boatrats Inc  
10675 Sorrento Valley Rd., Ste. 200  
San Diego, Calif. 92121  
Tel: 619-657-0100; Fax: 619-657-0101  
Website: <http://www.boatrats.com>  
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Fax: 011-44-181-500-8522

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Tel: 318-989-0444; Fax: 318-989-0475

Kongsberg Norcontrol AS  
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Email: [info@kvh.com](mailto:info@kvh.com)

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Hardware Description: Marine Stabilized antennas for communications and entertainment services (3-axis Gyro stabilization)  
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Fax: 011-47-67-24-46-21  
Website: <http://www.nera.no>

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# Mapping The Future Of Design

The advent of software solutions has infiltrated nearly every sector of the maritime market — from propulsion performance monitoring packages to personnel. It arguably has had no greater impact, though, than in the design and construction of new vessels.

CAD/CAM/CAE programs are invaluable assets to the designer, builder and operator of vessels of all sizes and dimensions. Not only do advanced programs allow for the creation of an efficient and cost effective ship structure and outfitting, they provide for enhanced manufacturing practices and techniques, and increasingly help devise a life-cycle maintenance and care plan which can tack profitable years onto a vessel's life.

While major providers of CAD/CAM/CAE solutions and users have struggled to arrive at common ground regarding interaction among different maker's systems, there is today a greater cooperation to ensure that one particular brand or another can interact. This mandate for commonality should surely pick up momentum as shipyards of all sizes in all geographic regions continue to merge with, or purchase one another. The driving force behind the consolidations is of course profitability, which in the manufacturing arena — particularly shipbuilding, where prices have generally been stagnant — equates to greater manufacturing efficiency. Thus, it would be reasonable to assume that shipyards would want one of their greatest efficiency tools — CAD/CAM/CAE systems — to be somewhat compatible.

While CAD/CAM products are particularly effective in designing everything from components to systems to entire vessels, the trends is toward comprehensive systems that allows ship designers, builders and owners to integrate design, trial and "cost crunch" a vessel before steel is even purchased. According to Markku Kanerva, director of marketing, pro-

jects and R&D at Finnish **Deltamarin**, the ship design and building process is in front of revolutionary era of development. 3-D computer aided modeling techniques has been utilized to produce the production drawings and documents. Kanerva says that Deltamarin developed the first 3-D engine room model already in 1987 and since that time, close to fifty design models have been developed.

Deltamarin today — via strategic alliances such as that with which **IBM** and **Dassault Systems** in the use of its innovative CATIA program — the 3-D design models are changed into 4-D Product Models. Complete model of the ship is already

the project stage.

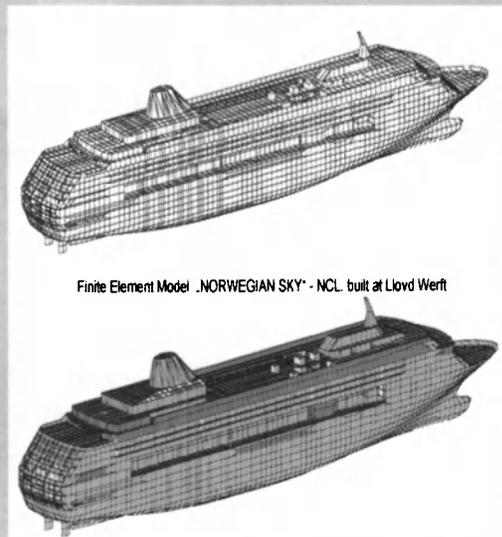
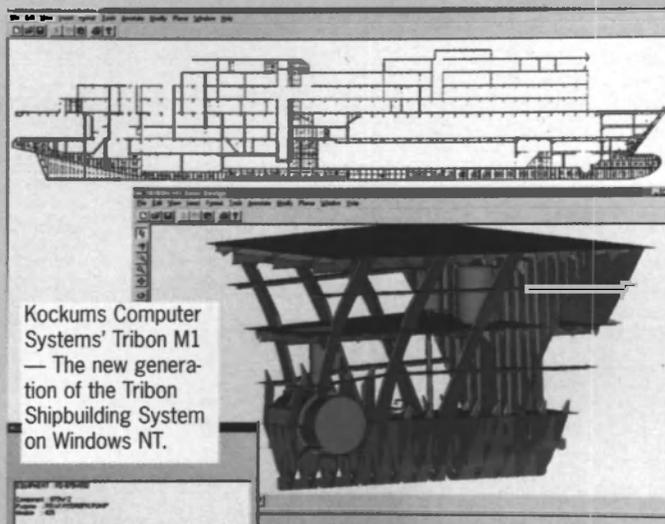
Building procedures, block subdivision, subcontracting, all can be simulated, visualized and tested with the 4-D Product Model even before the shipbuilding contract is signed. Building process can be verified with a virtual shipyard model, i.e. combining 4-D Product Model of the ship with a simulation model of the shipyard. Complete design work is, of course, carried out in the same Product Model continuing from the contract model directly with all systems, arrangements, structures and other essential features in 3-D and getting approvals directly in/with the model.

This means that the product, the ship, is already defined and coordinated up to a high level of details at the project stage, before the shipbuilding contract, and without any extra costs. But the basic design phase, i.e. classification documents, layouts, purchase specifications and similar, is developed three to five months quicker and a lot of coordination man-hours are saved.

Kanerva contends that the Product Model technique will push the standardization forward and will introduce a major cost saving impact in shipbuilding.

## Recent Introductions

There have been many recent advances in the field of CAD/CAM/CAE systems this year alone, including the introduction by Korea's **Hyundai** of its "Hyundai Integrated Ship Performance Evaluation & Design System." The shipyard reasons that initial design is crucial in maintaining a shipyard's technological and competitive edges. Particularly, hull form and propeller design technology are of interest to shipowners and operators, two groups which continually seek advantages in fuel efficiency. The Hyundai "Hi Speeds" system — under development for two years — is designed to integrate all of the process of hull form and pro-

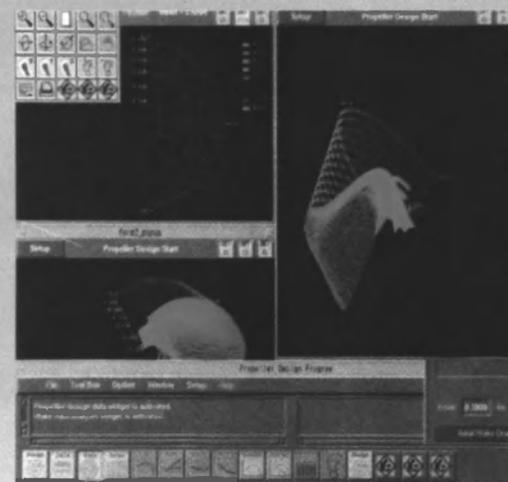
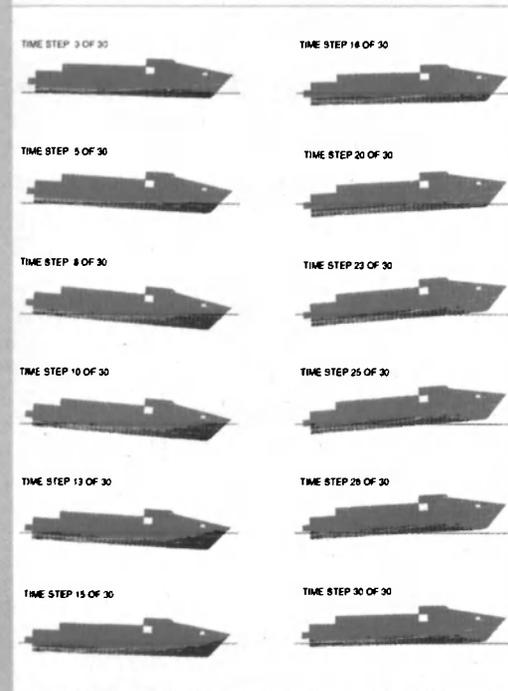


Finite Element Model .NORWEGIAN SKY\* - NCL, built at Lloyd Werft

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Hyundai's new high-speed "Hyundai Integrated Ship Performance Evaluation & Design System."

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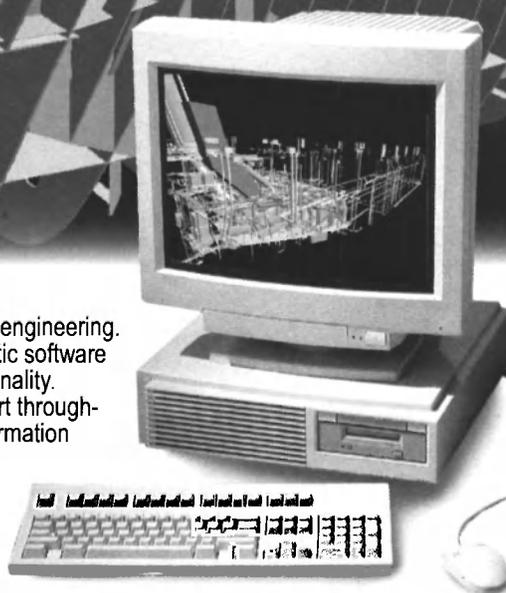
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3D CAD model is courtesy of Slovenske Lodenice Komarno shipyard

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Output of documentation is automated to the greatest degree and the software runs on Unix and Windows NT. It is a true client-server solution and can be configured from a single seat to large network installation. Nupas-Cadmatic Software is continuously developed by a large team of software engineers devoted to improve the processes within the shipbuilding industry. Don't hesitate to contact us right away to hear and see what Nupas-Cadmatic Software can offer to improve your shipbuilding.

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## CAD/CAM/CAE

pellier design. The system also contains a database including information on more than 300 ships built or developed by Hyundai, a source of information which the yard contends will only aid future design and development.

Another perennial leader on the CAD/CAM front has been Sweden's **Kockums Computer Systems (KCS)**,

powered by its world-class Tribon ship production system. KCS recently announced Tribon M1, a new generation of the leading Tribon software system for ship design and building. Tribon M1 is designed to offer a new level of efficiency in shipbuilding design and production, using the MicroSoft NT based technology to establish standards in

terms of ease of installation and use, as well as 3-D design development and management. Tribon M1 offers full 3-D high speed solid display technology for modeling and viewing to all designers using standard PC equipment. Tribon has four focused areas of applications, including design, rule-based automated design, design management and produc-

tion engineering.

**Intergraph** has a long history of working closely with shipbuilding customers on such projects as U.S. Navy CAD-2, LPD 17 and DARPA/MARITECH, and various European and Asian Navies such as DCN in France, Bazan in Spain, Fincantieri in Italy, and the Turkish Navy. The company developed a suite of products that provide an Integrated Ship Design and Production (ISDP) environment. The Intergraph ISDP environment provides systems and services to support the design, construction, maintenance, overhaul, alteration, repair, and refurbishment of ships and shipboard systems. Intergraph successfully completed in the U.S. ISDP is being used in the design of the U. S. Navy's LPD 17 amphibious ship and by commercial shipbuilders worldwide. In conjunction with international industry partners, Intergraph is currently developing the next generation system that will streamline shipbuilding processes, deliver better ships, lower manpower and material costs, and reduce the time to construct world-class naval and commercial vessels. Intergraph's shipbuilding solutions are based on WindowsNT architecture.

Recently **Albacore Research Ltd. (ARL)** added new features to its CAD-Link 98 program, which the company reports is the only software that allows shipbuilders to create a 3-D structural product model using AutoCAD Release 14. CAD-Link98 provides full 3-D structural modeling inside of AutoCAD 14, and it effectively hides most of the complexity of drawing in 3-D. Structur-

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## NUPAS-CADMATIC Expands Norwegian Business

NUPAS-CADMATIC - suppliers of an advanced 3-D ship design and engineering software - has won a contract with two new customers in Norway for the new Windows NT release. This is a breakthrough for the company, as the new 3-D CAD/CAE/CAM standard for Norwegian shipbuilding according to Matti Juntunen, marketing manager of Cadmatic Ltd.

Vik-Sandvik AS - the biggest independent consulting company for shipbuilding in Norway - has purchased the complete package of NUPAS-CADMATIC to improve its ship design and engineering. Another new customer, Frank Mohn Flatøy AS, Oil & Gas Division has purchased NUPAS-CADMATIC Piping modules. The goal is to improve the piping engineering for hydraulic piping, which they are designing, manufacturing and delivering around the world.

The first customer in Norway to select the complete NUPAS-CADMATIC package was Ulstein Verft AS in Ulsteinvik.

Circle 196 on Reader Service Card

al modeling starts with 3-D sections that are imported from a hull fairing system. With a single command, CAD-Link98 generates one 2-D drawing for each frame, girder or deck. CAD-Link also is designed to address many time consuming procedures in part production, with interference checking of parts to allow for easy identification and changing of intersecting parts.

**Maestro** Version 8.0 is loaded with new features, including composite panels, masses, acceleration and load balancing in waves. The latter three features allow a complete and rigorous quasi-static modeling of dynamic loads, throughout the entire structure. According to Nick Danese of **Design Systems & Technologies**, today's users of advanced CAD/CAM programs have a large part in future version developments, crediting as much as 75 percent of functionality due to direct customer requests. "We think we are good programmers, be we don't know everything about ship design," Danese conceded. "We have to ask our customers."

Design Systems & Technologies and **SPAR Associates** recently demonstrated new computer software, specifically the visual cost estimating system which links hull structure modeling with cost estimating. Developed by **Proteus Engineering** and SPAR, the development is a real-time link between Maestro and EstiMATE, thereby transforming Maestro Modeler into a very rapid and effective cost-product modeler. The hull model allows rapid development of structural scantlings organized by ship zones and basic type of structural assemblies. The material cost estimates are developed using prices from a standard parts library for plates and shapes.

A major contract with Halter Marine was recently signed by **AeroHydro**, a pioneer in CAD for boats and ships. Halter purchased the MultiSurf, MSDEV and MSPLEX to design new commercial marine vessels. The combined use of the technologies will reportedly help Halter create accurate lofting and NC machining, reduce scrap and accelerate the assembly process.

MultiSurf is AeroHydro's flagship product, and is an advanced 3-D surface modeler for marine applications. The technology is based on AeroHydro's patented relational geometry engine that allow complex models to be created and modified with precise and enduring relationships among parts. "Shipbuilders face fierce global competition. The use of leading-edge technology such as MultiSurf, MSDEV, and MSPLEX is critical to enhancing engineering efficiency and product quality," said Bob Watkins, Halter's hull chief.

**Autoship Systems Corporation**

released a library of marine gear and equipment models. The models will help in the preliminary assessment of space available on deck, and to enhance the visual presentation of the vessel's design. This library is reportedly the first of its kind in the software design marketplace and will enhance the design tools available to Autoship users.

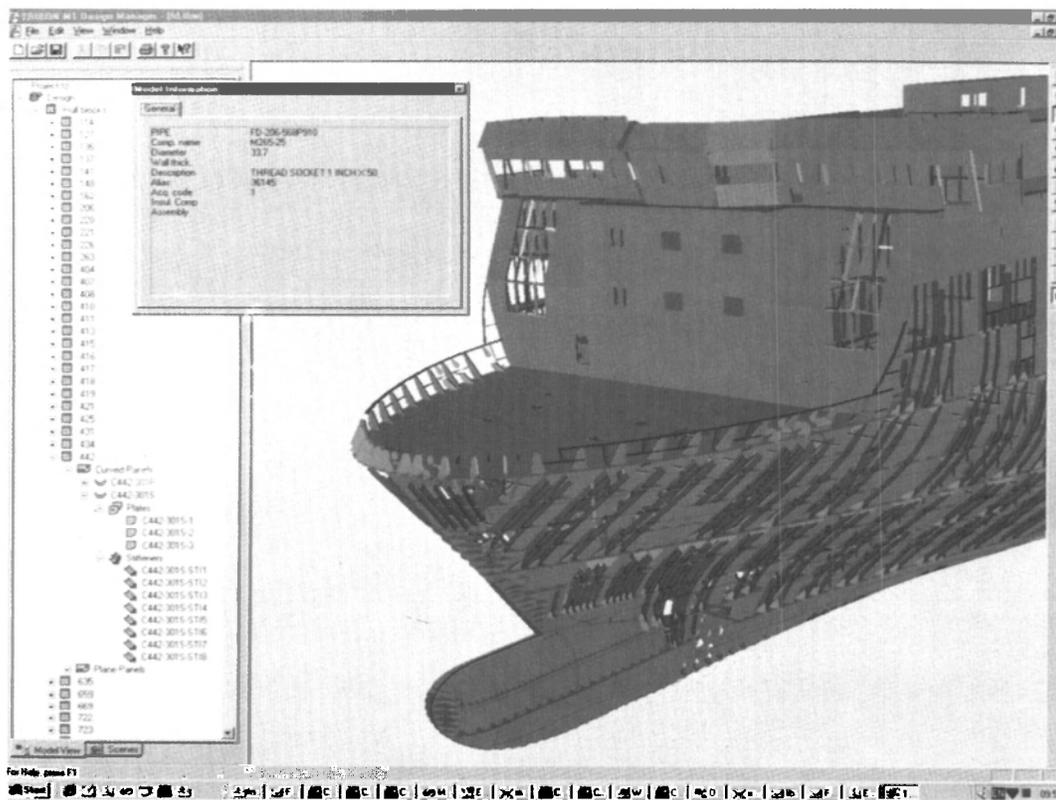
The models have been developed in the Autoship-hull design/surface modeling program, and are native Autoship files (PR3).

The models are imported into the user's Autoship vessel definition. When making a presentation to an owner or an investor, the models will make the difference providing a design looking very

realistic, convincing and professional.

The list of currently available models include: anchor, antenna, antenna radar, satcom antenna, 3 types of life boats, 3 types of rescue boats, 2 types of cranes, door, 2 types of hatches, 2 types of ladders, life raft, life ring, monitor, mooring bitt, mooring chock, navigation light, 3 types of propellers, rail, seat, stair,

# TRIBON M1



Courtesy by van der Giessen-de Noord B.V.

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## CAD/CAM/CAE

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**Hydrograph** recently upgraded its PropExpert software to version 4.1. PropExpert is a software tool for the selection and analysis of propeller systems for workboats and pleasure craft. New added features in version 4.1

include: e-mail, databases import and export, and a "cubic" prop curve. The addition of e-mail into PropExpert allows a user to send a formatted summary report and/or technical appendix to clients and co-workers quickly and efficiently. This eliminates the need for printed reports, as a complete sizing

analysis can simply be sent anywhere via e-mail. The import/export functionality was included in version 4.1 to make data more accessible to PropExpert. Now, PropExpert is able to search through files of various types for information that can be used in a sizing analysis.

FORAN from Spain's **Sener** has been chosen for one of the year's more technically challenging jobs, the re-birth of the Philadelphia Shipyard. The decision by Kvaerner to sell all of its shipbuilding assets, the as-yet developed Philadelphia yard included, notwithstanding, the FORAN system was chosen to be at the forefront of the yards entry into the commercial newbuild market. The FORAN package for Philadelphia is a comprehensive one, including fairing, outfitting design, outfitting production, electrical design and walk through.

**Yachting Consult** of the Netherlands is an engineering company focusing on the yacht and shipbuilding industries, undertaking both software development and CAD/CAM engineering services. The company's MasterSHIP software is production oriented, and automates the building preparation stages. It is fully integrated with AutoCAD 14 and 2000 under WindowsNT, 95 and 98. The modules for automatic nesting, lofting, parametric drawing and NC cutting are found to be particularly useful in shipyard applications. Surface Tools is the newest module in the MasterSHIP suite, and it is designed to speed up the CAD/CAM lofting process. A handy feature of the module: the projection mode to generate intersections with the hull surface for items such as bowthrusters and chin pipes.

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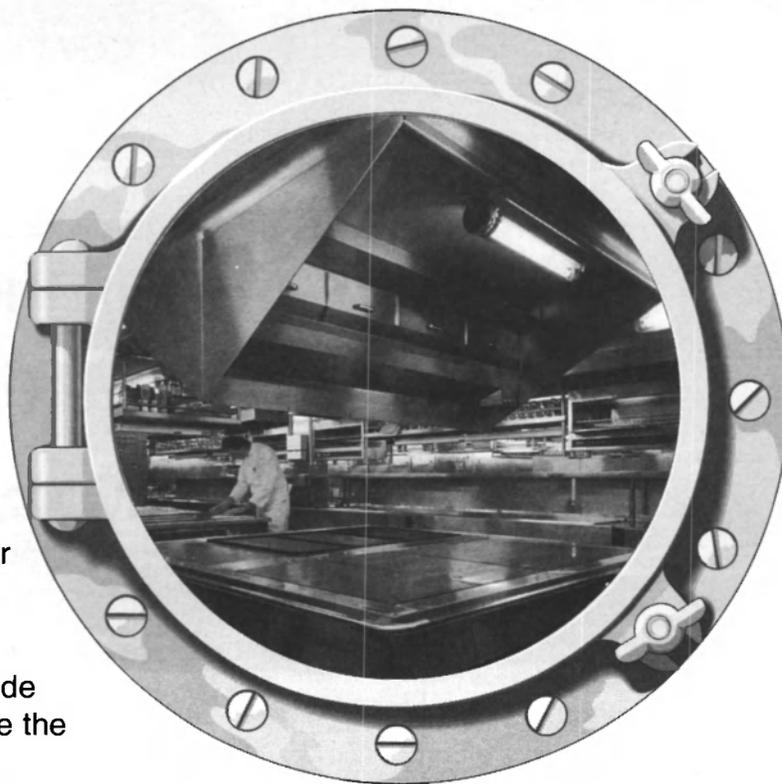
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## CAD/CAM/CAE • Company Notes

• **Victaulic Co. of America**, in cooperation with Rebis Industrial Workgroup Software Co., has developed a 3-D software program for modeling its grooved and plain-end mechanical piping system. *Advantage:* the program enables piping system designers to incorporate various Victaulic components, producing 3-D models that allow for system optimization.

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• **Cimatron Ltd.**, a developer of CAD/CAM solutions for the tooling process, announced an agreement with CAD/CAM applications developer, Regba and Bercom to enhance the functionality of Cimatron's MoldBase3D module.

*Advantage:* The improved MoldBase3D module will use 3-D solids in mold, tool and die making, drastically increasing its functionality for mold design and detailing.

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• As a part of its strategy to improve the overall quality of heat transfer products fabricated at **Diversified Heat Transfer**, the company upgraded its computer aided capabilities to include the most current level of hardware and software (AutoCAD, Version 14) used to design, engineer and manufacture its heat transfer equipment. *Advantage:* A faster, more accurate manufacturing process.

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• Version 7.00 of GHS (General HydroStatics) the popular PC-based ship stability/strength software package is due to be released this month. It represents a major milestone in the continuing enhancement of GHS by its original developer, **Creative Systems, Inc.** This version takes advantage of the resources available in 32-bit operating systems to improve performance and user-convenience. It also provides several new features and many refinements. Among them are: Full A-265 (VIII) probabilistic damage; Torque calculations; Bulkhead shear corrections; Calibration of tank properties to match external data; A new geometry editor; Easier printer setup.

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• NavCad is a naval architect's tool offering an integrated platform to predict resistance and power, and to determine optimum propeller parameters. The two most valuable additions to this

initial release of version 3.7 include: new prediction methods and optimum trim analysis.

A number of new resistance prediction methods have been added for semi-displacement hulls. These include VTT Round Bilge, VTT Hard Chine, the U.S.

Navy CRTS method and Jin-1988. A shallow water added drag method for fast monohulls has also been developed. On-going developments for the coming months will strengthen the use of NavCad for ship design and operation. Upcoming features will include a con-

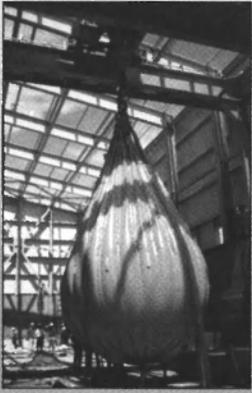
ceptual bulb designer to help identify basic geometric parameters of a bulbous bow during the early design stages, and a voyage analysis spreadsheet to help plan route options and review designs over an entire operating profile.

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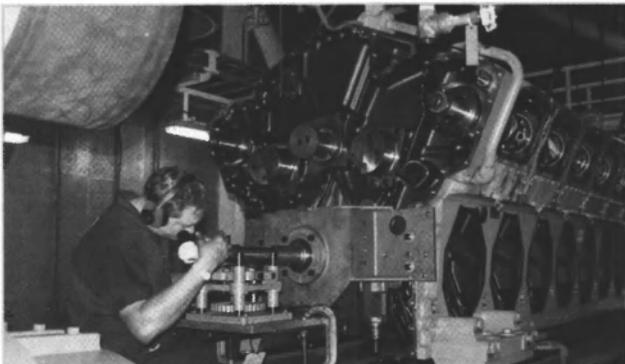
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## Ship Repair & Conversion

### Ailsa-Troon Carries Out Record Number Of Repairs

Ailsa-Troon Ltd, Scotland's West Coast shipbuilding and repair yard, has recently performed work on various commercial and naval vessels — marking its busiest year ever.

Caledonian MacBrayne ferries has

docked members of its fleet, namely, Loch Dunvegan, Loch Tarbert, Loch Fyne, Lochmor, Clansman and Juno for

Ailsa-Troon has appointed Alastair Bisset as chief executive; Ian McKillop, yard manager; and John McFadyen, shiprepair manager.



their annual maintenance program and refits. Other vessels currently in-house are Gardner's coast tanker, St. Kearnan, which required 12 tons of new steel-work. Scheduled refit work was also performed on two Cory Towage operated tugs, Battleaxe and Warrior, resulting in Cory obtaining regular service agreements with the yard.

### USS ESSEX At NASSCO

The National Steel and Shipbuilding Company (NASSCO) drydocked the 844 x 106 ft.

(257 x 32.3 m), USS

ESSEX (LHD-2), the first amphibious



assault ship to undergo maintenance drydocking. NASSCO was awarded the \$490 million contract, December 1997, by the U.S. Navy, who wanted to improve "quality of life" for the sailors serving on these ships. USS ESSEX returned to operations in late June and will return for additional work to be completed on September 3 of this year.

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### Algoma Gives Contract To CSE

Algoma Central Marine awarded a \$3.77 million contract to Canadian Shipbuilding & Engineering Ltd. (CSE) to convert a single-hulled tanker to double-hulled construction at its Port Weller Dry Docks facility. This project will mark the first conversion, of this type, ever done at a Canadian shipyard. Algoma owns and operates North America's largest fleet on the Great lakes-St. Lawrence Waterway.

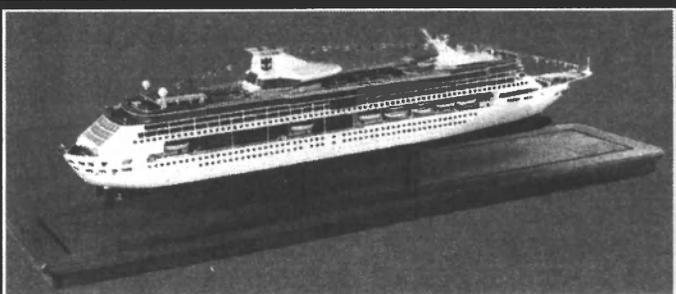
Circle 59 on Reader Service Card

### YVC Takes Over Shiprepair Activities At WF At Schiedam

Upon the realization that Wilton Fijenoord Shiprepairyard (WF) was available for acquisition by interested parties, Yssel-Vliet Combination (YVC) decided to take advantage of the opportunity by taking over all of the yard's facilities and shiprepair activities. The new YVC company, Rotterdam United Shipyards B.V., commenced its activities in April; the shipyard is comprised of five drydocks, along with modernized well-equipped workshops.

### Saipem Ready For New Offshore Operations

Before the new year commenced, Hydrex, headquartered in Antwerp, was contacted by the owners of Saipem 7000 to begin maintenance and repair work. The large semi-submersible crane vessel, constructed in 1987 by Fincantieri, has an approximate overall length of 656 ft. (200 m), a beam of 295 ft. (90 m) and an operation draft of more than 131 ft. (40 m). Saipem 7000 is constructed with eight engines, four propellers and 10 thrusters.



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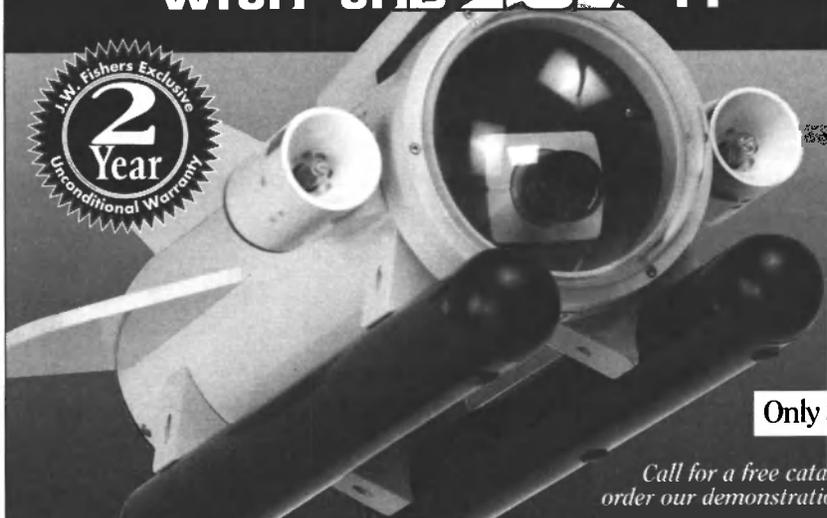
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## CAD/CAM/CAE • Company Notes

• **Victaulic Co. of America**, in cooperation with Rebis Industrial Workgroup Software Co., has developed a 3-D software program for modeling its grooved and plain-end mechanical piping system. *Advantage:* the program enables piping system designers to incorporate various Victaulic components, producing 3-D models that allow for system optimization.

Circle 83 on Reader Service Card

• **Cimatron Ltd.**, a developer of CAD/CAM solutions for the tooling process, announced an agreement with CAD/CAM applications developer, Regba and Bercom to enhance the functionality of Cimatron's MoldBase3D module.

*Advantage:* The improved MoldBase3D module will use 3-D solids in mold, tool and die making, drastically increasing its functionality for mold design and detailing.

Circle 84 on Reader Service Card

• As a part of its strategy to improve the overall quality of heat transfer products fabricated at **Diversified Heat Transfer**, the company upgraded its computer aided capabilities to include the most current level of hardware and software (AutoCAD, Version 14) used to design, engineer and manufacture its heat transfer equipment. *Advantage:* A faster, more accurate manufacturing process.

Circle 85 on Reader Service Card

• Version 7.00 of GHS (General HydroStatics) the popular PC-based ship stability/strength software package is due to be released this month. It represents a major milestone in the continuing enhancement of GHS by its original developer, **Creative Systems, Inc.** This version takes advantage of the resources available in 32-bit operating systems to improve performance and user-convenience. It also provides several new features and many refinements. Among them are: Full A-265 (VIII) probabilistic damage; Torque calculations; Bulkhead shear corrections; Calibration of tank properties to match external data; A new geometry editor; Easier printer setup.

Circle 86 on Reader Service Card

• NavCad is a naval architect's tool offering an integrated platform to predict resistance and power, and to determine optimum propeller parameters. The two most valuable additions to this

initial release of version 3.7 include: new prediction methods and optimum trim analysis.

A number of new resistance prediction methods have been added for semi-displacement hulls. These include VTT Round Bilge, VTT Hard Chine, the U.S.

Navy CRTS method and Jin-1988. A shallow water added drag method for fast monohulls has also been developed. On-going developments for the coming months will strengthen the use of NavCad for ship design and operation. Upcoming features will include a con-

ceptual bulb designer to help identify basic geometric parameters of a bulbous bow during the early design stages, and a voyage analysis spreadsheet to help plan route options and review designs over an entire operating profile.

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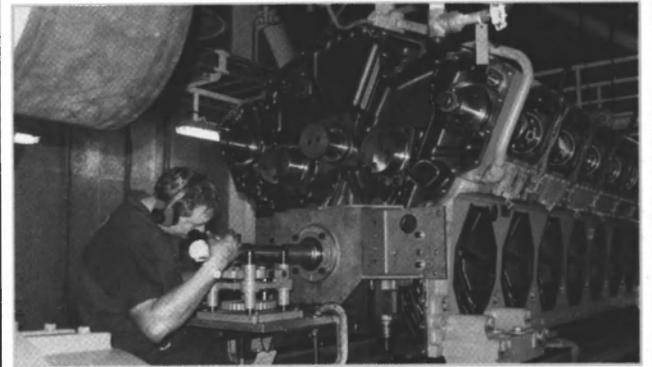
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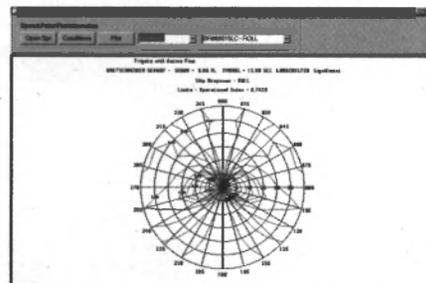
Circle 145 on Reader Service Card

# Proteus Engineering Releases New VisualSMP Seakeeping Software

VisualSMP is a suite of tools used in the prediction and analysis of a ship's seakeeping characteristics. Included in VisualSMP is the SMP95 strip theory based frequency domain seakeeping

program, the SEP96 seakeeping analysis program, the STH97 time history program, and the SWMP96 SWATH seakeeping program, all developed by the U.S. Navy. The U.S. Navy has selected

Proteus Engineering to distribute these tools commercially, and Proteus has used its experience in seakeeping analysis and software development to integrate and extend them, resulting in Visu-



alSMP. VisualSMP adds a graphical pre- and post-processor, together with tools to simulate and visualize the motion of the ship in a seaway.

Proteus has developed the graphical pre- and post-processor using the Microsoft Windows GUI. These tools speed the data input process and provide graphical tools to view the computed results. SMP95 input models consist of hull offsets, appendage dimensions, and controller coefficients. The hull offsets are described to the system as points on sections, including the stem and stern profile. Both transverse and longitudinal knuckles are allowed. The user may input up to 70 stations and 70 points per station.

SMP95 provides a potential flow solution based on linearized strip theory. The assumptions inherent in this theory are that ship length is large compared to beam and draft, and that hull section and waterplane properties are represented by the calm water values. The latter condition requires that ship motions be limited to small amplitudes. Accuracy will be reduced for ships with low length-to-beam ratios (less than 5), where end effects are significant, and for large amplitude motions (wave heights in excess of draft) where non-linear effects such as bow flare are significant.

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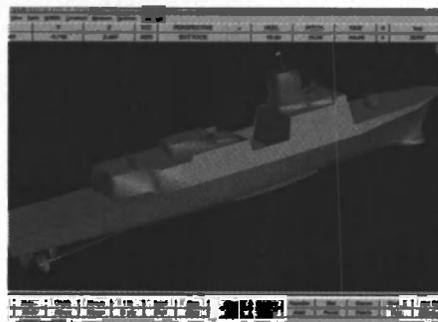
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## Proteus Participates in Ingalls Shipbuilding's Norwegian New Frigate Concept Design

Recently Proteus Engineering worked with Ingalls Shipbuilding on its concept design for the Norwegian New Frigate proposal. Ingalls tasked Proteus to perform various aspects of naval architecture, including hullform design and



modeling, stability and hydrostatics, resistance and powering, seakeeping prediction and visualization, maneuvering, and structural analysis. In addition, engineers from the Engineering Technology Center (another division of Analysis & Technology) worked with us to provide ship signature and weapons effects analysis. Before any of this could happen, however, Proteus worked closely with Ingalls and the U.S. Navy to obtain the required U.S. Department of State export license.

Through the use of various components of the FlagShip system, Proteus was able to give a quick, accurate analysis of the proposed design to Ingalls, helping to enable the proposed concept design to meet or exceed the stringent requirements put forth by the Royal Norwegian Navy. Hullform data was taken directly out of FastShip to enable the stability, resistance and powering, seakeeping, maneuvering, and structural analyses to begin very quickly. As data came back from these analyses, changes were made to the hullform which could then be easily re-analyzed. At the same time, the geometrical model was being used to evaluate the radar cross section shaping of the ship. Because of this approach, one geometry model was used as the basis for all of these analyses, helping to avoid errors in data input, and speeding the entire process.

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### Drew Marine Offering Its FUEL MILL® Homogenizer For In-Line Fuel Management

Drew Marine, worldwide supplier of marine chemicals and water treatments, is offering its FUEL MILL homogenizer as part of its comprehensive fuel management program. The Fuel Mill is a milling machine that physically alters fuel characteristics. When the heavy fuel is pumped through the machine's concentric, cone-shaped gears, it is exposed to frictional forces that shear asphaltenes as large as 70-100 microns — to approximately five microns. Smaller particle size allows the fuel to pass through the purifier without forming sludge. The system can also be used to homogenize fuel with fresh water. Under high-temperature and pressure, the process creates a fine spray of water droplets coated with fuel. Because of the high temperature, the water will flash into gaseous states of oxygen and hydrogen, which will combust — and the fuel coating the water will explode into smaller droplets. The resulting improvement in combustion allows a reduction in the excess air put into the engine for combustion — along with 78 percent nitrogen content. As a result, there will be a decrease in NOx emissions.

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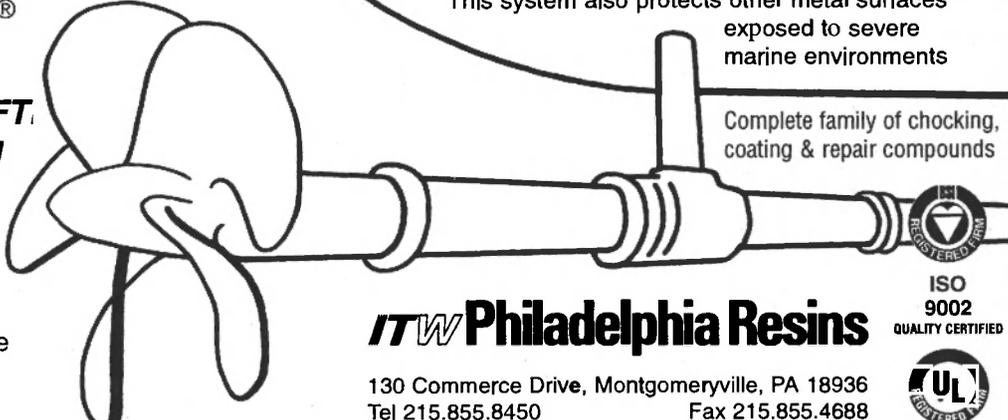


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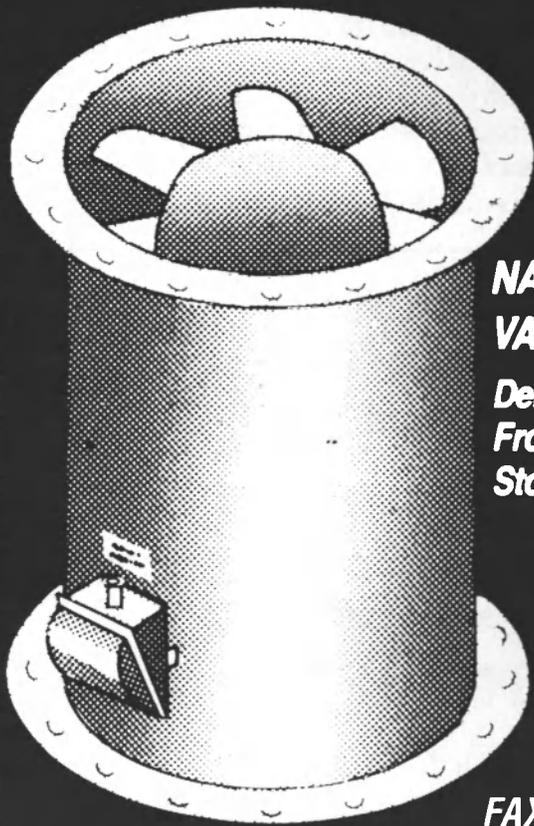
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## Tech Power Adding Manufacturing Facility

Tech Power Controls Co., designer and manufacturer of electrical power conversion equipment, is adding a new manufacturing facility at a site adjacent to its headquarters building in Southwest Houston. The new 24,000 sq. ft. facility, not only allows the company to consolidate leased space operations, but also more than doubles its total manufacturing assembly area. The new building is slated for an August completion.

## American Superconductor, U.S. Navy Sign Contract

American Superconductor Corporation (AMSC) signed a contract with the U.S. Navy's Office of Naval Research (ONR) to design a high temperature superconducting (HTS) motor for naval ship propulsion systems.

Under the agreement, American Superconductor will design a 25,000-hp HTS ship propulsion motor for future navy ships. The application of HTS

technology to ship propulsion is expected to yield inherently quieter motors that have much higher power density, and are approximately one-fifth the size and weight of conventional motors of the same hp rating.

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## AlliedSignal, MTU Combine For Gas Turbine Business

AlliedSignal and MTU Munchen, a subsidiary of DaimlerChrysler Aerospace, have agreed to form a \$100 million joint venture company named Vericor Power Systems. The new company will market, sell and provide customer support for aeroderivative industrial and marine gas turbines ranging from 0.5 to 15 MW.

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## Princess Cruises Orders Four New Cruise Ships

Princess Cruises, a subsidiary of Britain's Peninsular & Oriental Steam

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Maritime Reporter/Engineering News

Navigation Company (P&O), announced an order for four new ships, which, by 2004, will more than double the size of its fleet. All four ships will build on the company's successful Grand Class Cruising concept. Chantiers de l'Atlantique, of St. Naziere, France, will build two 88,000-ton vessels that have a combination of diesel engines and gas turbines.

The other two 110,000-ton vessels will be built by Mitsubishi Heavy Industries, making this the first cruise ship vessel built by Japan. The vessels will be built to accommodate 2,600-passengers. The ships will be delivered between October 2002 and May 2004.

### FirstWave/Newpark Awarded Trio Of Contracts

Providing ship repair, conversion, new construction and related services for barges and other vessels, FirstWave/Newpark Shipbuilding has garnered three new contracts.

Pleiades Shipping Agents awarded the company for collision damage repair of the 55,000-dwt vessel, MT Nestos. The ship, which sustained damage on its port side near the bow and just above the waterline, underwent repairs at the company's East Pelican Island facility.

FirstWave has also been granted a contract by East Boston-based Sterling Equipment for the construction of two 140 x 40 ft. (42.6 x 12.1 m) offshore deck barges scheduled for delivery in 1999. In addition, the company will also repair the mat on the Phoenix VI rig for Rio Grande Supply Company.

Circle 44 on Reader Service Card

### U.S. Navy Proposes Five Year Charter of Fleet Salvage Tug

The Naval Sea Systems Command (NAVSEA) is planning to lease/(bare-boat charter) the fleet salvage tug USNS Narraganset (T-ATF 167) to a U.S. company that can show that it will use the Narraganset to support offshore salvage facilities.

The vessel will be leased on an "As Is, Where Is" basis. The 226 ft. (68.8 m), 7,200 hp Narraganset, currently in classification with ABS, is under continuous survey, and has a Certificate of Inspection (COI) issued by the U.S. Coast Guard (USCG).

The successful lessee must acquire and maintain its own current and updated ABS class certifications, USCG certificate of inspection, adequate insurance and demonstrate that it can adequately maintain and operate the vessel over the a proposed five-year lease period. The vessel will be in use by the U.S. Navy through July 1999 after which a

maintenance period is planned on the west coast in the August 1999 to September 1999 time-frame where potential lessee visitation and inspection could occur.

The proposed lease award is currently anticipated for late FY 1999 or early FY 2000. Vessel inspection information

including scheduling and availability to prospective offerors will be outlined in the upcoming solicitation planned for release in mid-July 1999. All solicitation documents and related correspondence will be posted on the Internet at the Naval Sea Systems Command (NAVSEA) Contracts Directorate Web-

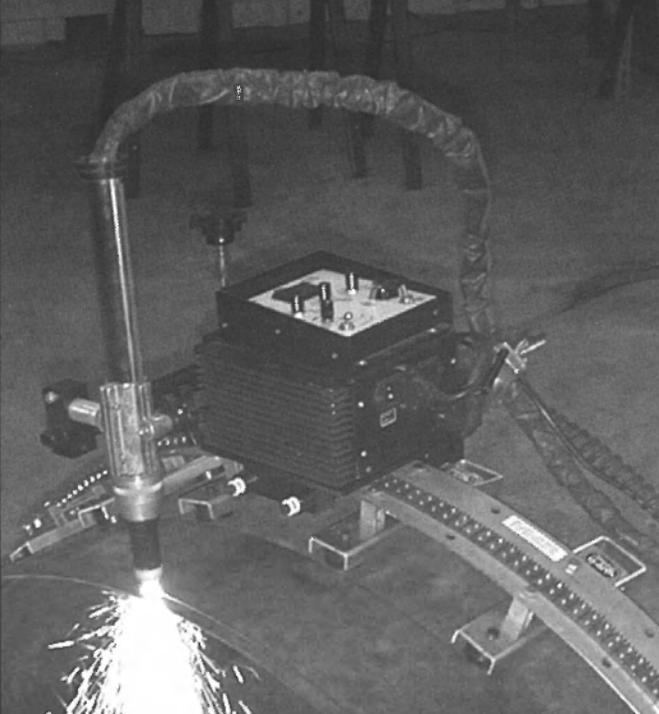
site located at <http://www.contracts.hq.navsea.navy.mil> under the proposed solicitation number N00024-99-R-8135.

To be added to the bidders list, please contact:

Naval Sea Systems Command (NAVSEA); Attn: William Randolph / SEA 02812R; 2531 Jefferson Davis Highway; Arlington VA 22242-5160; tel: (703) 602-6911 ext. 258; fax: (703) 602-5478;

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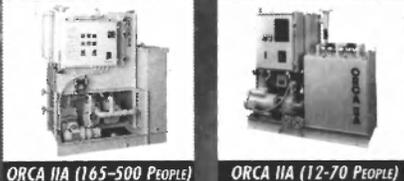
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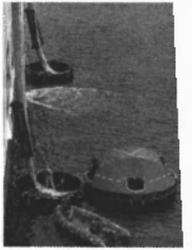
Kongsberg Norcontrol and Thomson-CSF Detexis signed a partnership agreement involving the design, development, manufacturing and marketing of Maritime Black Box (MBB), a shipborne voyage data recorder (VDR). The MBB collects data in the event of

an accident, thereby enabling the government authorities and maritime organizations to evaluate and investigate the causes in both a systematic and reliable process. The MBB was originally issued from a European Union's program, and is in compliance with IMO regulations to enhance passenger safety and protection environment.

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### DBC's MES System Gets EU Certification

DBC Marine Safety Systems announced the completion of its CE type approvals by Bureau Veritas for its SOLAS-approved MES evacuation system. The MES is a chute sys-



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em designed to work in conjunction with DBC's 50-person liferafts. The design also incorporates a gravity operated system that has no reliance on electrical or hydraulic power.

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### Pains-Wessex Introduces The SOS Rescue SART

Pains-Wessex Safety Systems Inc. is now offering the SOS Rescue SART (Search and Rescue Transponder), a 9 GHz receiver/transmitter, which is compliant with the latest GMDSS and IMO requirements. When activated, the SART will react to pulses from any standard X-band marine radar operating in the 9.2-9.5 GHz band.

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### Rutter Technologies Exhibits New Maritime Black Box

Canadian-based Rutter Technologies, exhibited its new Voyage Data Recorder (VDR), a safety and management tool for the maritime industry, at Oslo's Nor-Shipping '99. The VDR records all primary navigation information of a ship and has a unique playback and display feature so that recorded data can be downloaded on a PC via a high-speed LAN connection and a multimedia software package.

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### Instructional Videos Released on Maritime Medical Emergencies

A joint venture including Maritime Health Services, John Sabella & Associates Inc., and Walport USA have introduced, *Lessons From Real Life at Sea*, a series of instructional videos on maritime medical emergencies.

The incidents in the video are based on actual events drawn from the case files of Maritime Health Services Inc., a Seattle firm, which provides professional medical consultations to vessels at sea.

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### SEMCO Upgrades Fire Extinguisher System

SEMCO Maritime's SEM-SAFE, a water mist fire extinguishing system, was upgraded in order to fit a single nozzle in cabins of up to 18 sq. m., compared with the previous installation capability of 12 sq. m. SEM-SAFE also uses water at a much lower rate, for example 16.8 liters/min. per nozzle for an 18 sq. m. cabin nozzle, compared to 240-320 liters/min. for each conventional nozzle.

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### Unitor To Supply MED-Approved Firefighting Equipment

Unitor, Norway's international ships service specialist, is believed to rank as one of the first to supply shipboard firefighting equipment that meets the European Union's (EU) type approval for its new Marine Equipment Directive (MED.) The MED requires approval of marine equipment used onboard ships, which are registered in 15 member states of the EU, including Norway and Iceland.

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### Viking Liferaft Meets Latest Safety Standards

Viking Life-Saving Equipment's 100-person

self-righting liferaft has been approved by the latest international standards and requirements put out by the European Council Directive 96/98/EC on Marine Equipment. This type of life raft must be applied with slides or chutes installed onboard passenger ferries and large vessels, and as liferafts for direct boarding in the case of small ferries, or catamarans.

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63

## Ship Repair & Conversion

### Ailsa-Troon Carries Out Record Number Of Repairs

Ailsa-Troon Ltd, Scotland's West Coast shipbuilding and repair yard, has recently performed work on various commercial and naval vessels — marking its busiest year ever.

Caledonian MacBrayne ferries has

docked members of its fleet, namely, Loch Dunvegan, Loch Tarbert, Loch Fyne, Lochmor, Clansman and Juno for

Ailsa-Troon has appointed Alastair Bisset as chief executive; Ian McKillop, yard manager; and John McFadyen, shiprepair manager.



their annual maintenance program and refits. Other vessels currently in-house are Gardner's coast tanker, St. Kearnan, which required 12 tons of new steel-work. Scheduled refit work was also performed on two Cory Towing operated tugs, Battleaxe and Warrior, resulting in Cory obtaining regular service agreements with the yard.

### USS ESSEX At NASSCO

The National Steel and Shipbuilding Company (NASSCO) drydocked the 844 x 106 ft. (257 x 32.3 m), USS ESSEX (LHD-2), the first amphibious assault ship to undergo maintenance drydocking. NASSCO was awarded the \$490 million contract, December 1997, by the U.S. Navy, who wanted to improve "quality of life" for the sailors serving on these ships. USS ESSEX returned to operations in late June and will return for additional work to be completed on September 3 of this year.



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### Algoma Gives Contract To CSE

Algoma Central Marine awarded a \$3.77 million contract to Canadian Shipbuilding & Engineering Ltd. (CSE) to convert a single-hulled tanker to double-hulled construction at its Port Weller Dry Docks facility. This project will mark the first conversion, of this type, ever done at a Canadian shipyard. Algoma owns and operates North America's largest fleet on the Great lakes-St. Lawrence Waterway.

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### YVC Takes Over Shiprepair Activities At WF At Schiedam

Upon the realization that Wilton Fijenoord Shiprepairyard (WF) was available for acquisition by interested parties, Yssel-Vliet Combination (YVC) decided to take advantage of the opportunity by taking over all of the yard's facilities and shiprepair activities. The new YVC company, Rotterdam United Shipyards B.V., commenced its activities in April; the shipyard is comprised of five drydocks, along with modernized well-equipped workshops.

### Saipem Ready For New Offshore Operations

Before the new year commenced, Hydrex, headquartered in Antwerp, was contacted by the owners of Saipem 7000 to begin maintenance and repair work. The large semi-submersible crane vessel, constructed in 1987 by Fincantieri, has an approximate overall length of 656 ft. (200 m), a beam of 295 ft. (90 m) and an operation draft of more than 131 ft. (40 m). Saipem 7000 is constructed with eight engines, four propellers and 10 thrusters.



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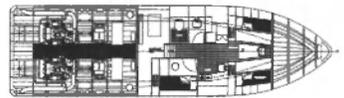
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## New & Notable

### Sarawak Delivers High Speed Boat

Sarawak Slipways of Sarawak, Malaysia delivered a high-speed 55.8 ft. (17 m) CAMARC aluminum alloy Pilot Boat for the Bintulu Port Authority in Sarawak.



The new twin screw vessel has a continuous service speed of 28 knots, and main propulsion by MAN D2840 diesels rated 650-hp @ 2,100-rpm in a "U" drive configuration and Finnscrew propellers via Reintjes gearboxes. During trial runs, the vessel achieved a speed of 29 knots at a full load, surpassing the requirement of 26 knots as stated in the contract.

### Tidewater Orders Pair Of Crew Boats

Tidewater Marine have ordered a pair of 145 x 26 ft. (44 x 8 m), 150-passenger, 12 cylinder Cummins powered crew boats from Swiftship in Morgan City, La. Carrying up to 16,000 gallons of fuel and 19,500 gallons of fresh water, the vessel's four-engines, rated at 1,350 hp at 1,950 rpm, will drive through Reintjes gears. A fifth engine rated 1,200 hp at 1,800 rpm, will be installed midships and aft of the main engine compartment, and coupled through a Reintjes WAF gear to a Hamilton 571 boost water jet.

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### Nichols Brothers Introduces Its Grandest Passenger Catamaran

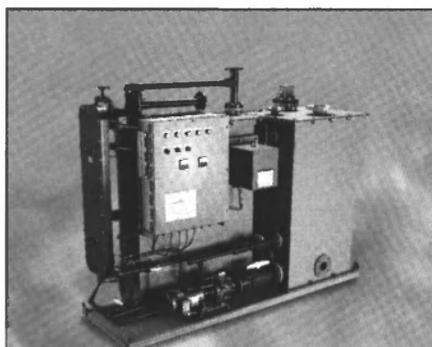
Nichols Brothers completed a 144 ft. (43.8 m), 450-capacity passenger catamaran for Catalina Cruises,

dubbed Catalina Jet. The vessel, which is the largest passenger catamaran to be constructed by Nichols, will run between Long Beach and Catalina Island at a speed of 36 knots. The vessel features four Caterpillar 1,950-hp diesel engines and Ulstein Bird Johnson waterjets. It is constructed with a Maritime Dynamics active ride control system for comfortable sailing.

The system is comprised of trim tabs and T-foils

beneath the twin hulls.

The catamaran is also equipped with three decks with indoor seating for 400 passengers and top side open air accommodations for an additional 50 people, as well as airline type and dinette seating.



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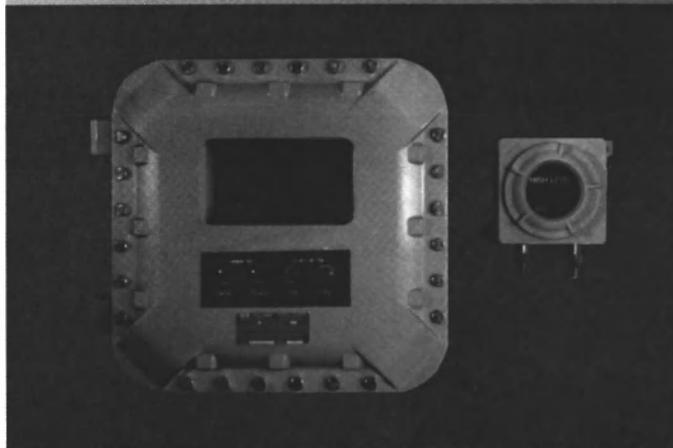
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## People & Company News

### Art Anderson Hires New Project Manager

Ralph E. Duncan has joined Art Anderson Associates as project manager for various projects currently being produced in the company's Marine Division.

### KVH Names Trimble To Board Of Directors

KVH Industries, Inc. has appointed Charles R. Trimble, founder of Trimble Navigation Limited, to its board of directors. With expertise on global positioning system (GPS) technology, Trimble established the company that bears his name in 1978, which designs, manufactures and markets GPS-enabled electronic products.

### New VP of Sales At Gulf Coast Dockside



Gulf Coast Dockside has elected Randy J. Taylor as vice president, sales. Taylor, whose background concentrates on industrial traffic management and bulk cargo stevedoring (at the executive level), will focus on sales and market development.

### Conti Retires As Webb Institute President

After serving as a member of the board of trustees of Webb Institute for the past 25 years, and as president for the past nine, Dr. James J. Conti has decided to

retire from both positions effective June 30. Conti, who received his Bachelor's, Masters and Doctoral degrees in Chemical Engineering, garnered his presidential post in July 1990, after serving on the Institute's Board since 1975. As president of the nation's independent engineering college geared toward naval architecture and marine engineering, Conti implemented changes such as the establishment of the Institute's graduate program.



### Sigma Launches Color Matching System

Sigma Marine has launched Color Network — a new coatings color matching system that provides a variety of color choices in three of the company's most requested high-performance coatings. Available at key supply points around the globe, the Color Network is designed for those on tight international schedules.

### Moran Towing Adds To Sales Department

Moran Towing Corporation appointed Captair James B. Murray to vice president of sales. Murray who was formerly vice president and general manager of the company's Turecamo of Savannah operation will direct the sales and marketing activities for Moran's operations in 13 ports.

### Management Changes At NRC

Mark Miller, president and chief operating officer of National Response Corporation has resigned his posi-

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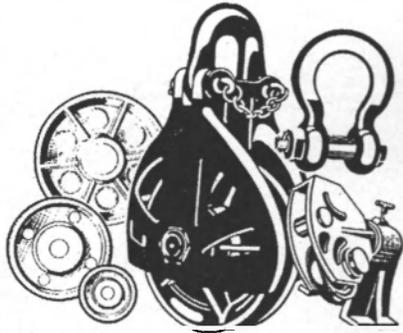
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, effective June 30. Miller, who will continue as a director of the company, starts NRC to become principal partner, president and chief executive officer of the Miller Environmental Group (MEG), an environmental remediation and response firm. **Steve Cannon** will serve as acting chief operating officer; and **Randall Blank**, a director of NRC will assume the position of interim president.

### Costal Acquires Oceanfast

Costal has secured the operations of luxury motor yacht builder, Oceanfast, which will operate under its current name as a separate entity.

### MAC Reports Decision

#### Two Pertinent Issues

The International Council on Combustion Engines (CIMAC), has introduced a new membership status and has announced its activities of its Working Groups Users. The Council is now accepting individual companies and institutions as associate members — due to its small size. The new status, which grants these individuals full participation in CIMAC Council Meetings and activities, however will not allow these members the right to vote.

Formed after the 1995 CIMAC Congress in Interlaken, the Working Groups Users has brought forth the following resolutions: the expansion of CIMAC-ISE, the working group's database, member Case Stories/Early Warning System which provides mutual information on recent engine failures between members, grading system for service users and recommendation for users.

### Vickers Plc Appoints Key Management Positions

Vickers Plc has named various management positions within the Vickers Marine Systems Division.

**Morten Ulstein**, who had been running the Ulstein Group's Propulsion Division, will serve as CEO, heading up its major business units. **Juha Lanu**, formerly with Kamewa Finland, has been promoted to executive vice president of the Propulsion Division. **Mag-Bernson** will remain as executive vice president of the Engine Division. Marine Technology and Global Support will now be headed by **Steiner S. Kulen** and **Oddbjørn Eliassen** will take charge as executive vice president of Vickers Machinery.

In addition, **Ingar Jensen** resigned as CEO of Vickers Marine Division to pursue outside opportunities.

Through its wholly-owned Norwegian subsidiary, Vickers Marine ASA, Vickers has taken over all shares in Ulstein Holding ASA.

### Leica Presents Its Newest Chart Navigator

Leica Geosystems has introduced its marine GPS chart navigator complete with a large 6.5-in. daylight-readable color display. Consisting of a high-accuracy 12-channel GPS receiver/antenna unit, the new apMK30 navigator also holds a thin-panel display/control console complete with

built-in C-MAP NT chart plotter.

Designed with the realistic mariner in mind, the apMK30 includes an active-matrix TFT screen, with sharp vector cartography.

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### GL Quality Confirmed By USCG

Based on results from the last three years, the United States Coast Guard

recently published its figures on the Port State Control detentions and performance for the various classification societies, naming Germanischer Lloyd (GL) as safety leaders. Able to expand its market share throughout 1998, the entire spectrum of the society's services were presented at last month's Norshipping '99 in Oslo, Norway.

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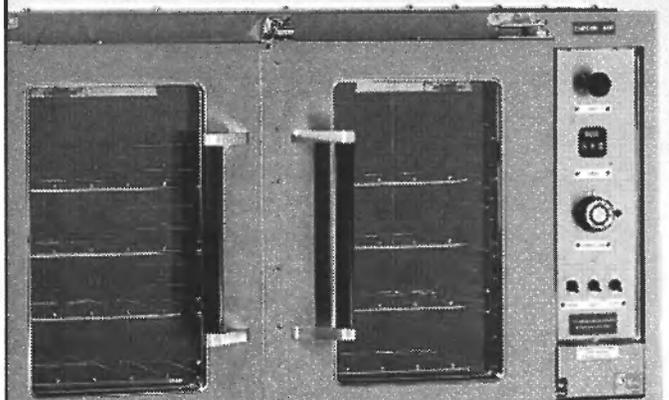
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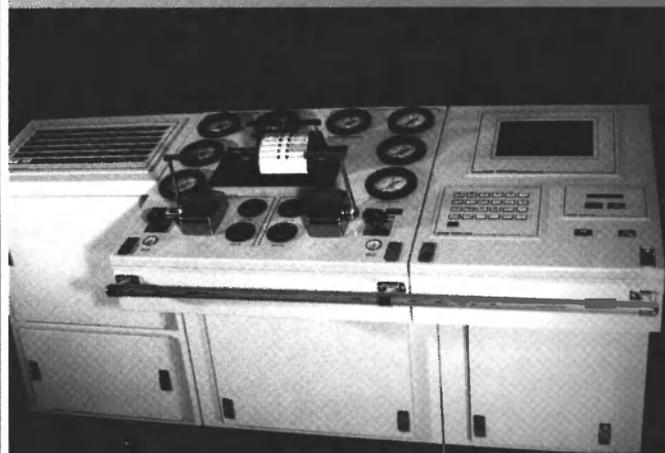
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Italy

# Market resiliency with style

Much like its European colleagues and competitors, the Italian maritime market has weathered a stagnant economy, a less than harmonious entrance into European monetary union, and fierce competition from Asia. Despite it all, the Italian maritime sector has maintained its trademarks: the production of high-quality, high fashion, and high-value ships and equipment.



Rodriquez Cantieri  
Navali Isola di Capri.

**A**mong its recent newbuilds, mainly its recent completion of the Disney Wonder, Fincantieri has made lucrative waves with a slew of new vessels, beginning with the delivery of M/V Excelsior to shipowner **Aldo Grimaldi** by Ses Cantiere Navale S.p.A. (Fincantieri Group). In a christening ceremony, which took place in the past May, the ship was blessed by its sponsor, Mrs. **Eugenia Grimaldi**, the shipowner's wife. Built at a cost of about \$115 million, Excelsior is the fifth new ship in the Grandi Navi Veloci fleet — wrapping up the final phase of Grimaldi Group's construction project.

Awarded with the highest class for international long navigation in addition to all certifications and compliance with all regulatory and international conventions in force, the vessel measures 663 (202 m), 40,000-gt, and is equipped to hold more than

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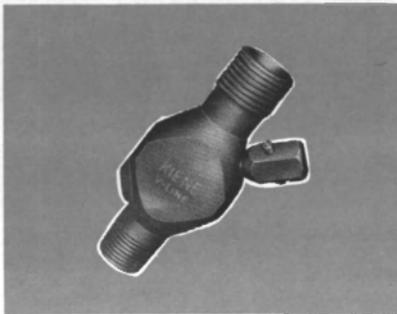
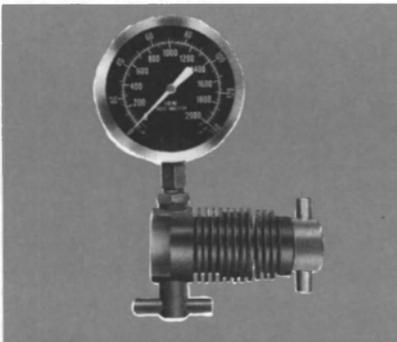
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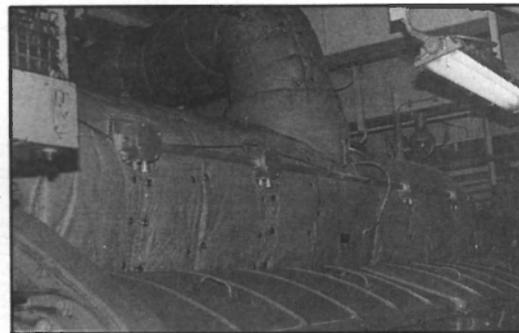
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passengers and 1,000 cars. Excelsior debuted internationally May 1998 on the Genoa-Barcelona route, replacing M/V Fantastic for two weeks. Following its inaugural run, Excelsior will assume operation this summer on the Genoa-Olbia route.

Looking ahead, Sestri Cantiere Navale S.p.A. (Fincantieri Group's) current workload is comprised of the construction of a 17,000 mc LPG, Marigola, for the company Carbocke International S.p.A., and the building of two new-generation conventional, high speed ferries for the Greek shipping company Ionian Lines.

Named Knossos Palace and Festos Palace, the impending newbuilds will travel at speeds of 29.5 knots. With first keel cutting having just occurred for the first ferry, commitment from these instructions will assure activities to the shipyard until spring 2001.

This past December 1998 and March 1999, the third and fourth MDV 3000 huber fast ferries, ordered by Tirrenia, were launched at Fincantieri's Riva Trigoso Shipyard.

The first two ferries in the fleet were delivered in May and summer 1998 and have since experienced successful runs on the Civitavecchia-Olbia route.

Transporting 1,800 passengers and 500 cars at a service speed of more than 30 knots, the vessels measure 476 ft. (145 m), and are equipped with sea-keeping capabilities that allow them to surpass the present operational limits of existing fast ferries in Sardinia routes.

The vessel pair is powered by four diesel engines and two gas turbines supplying a combined 95,000-hp. Connected to the gas turbines will be two booster water jets, while the diesels will boast a connection to the largest steering water jets ever to be built.

The third installment of the Superseacat trio ordered by Seacontainers was delivered on March 16 to the company from Fincantieri's Muggiano Yard in La Spezia.

With a contract agreement signed in November 1995, keel laying began on January 28, 1998.

The first two ferries of the Superseacat family, Superseacat One and Two have currently been operating on North European lines for the past two seasons.

Measuring 82 ft. (25 m) more than its two sisterships, Superseacat Three boasts an overall length of 328 ft. (100 m) with a beam of 56 ft. (17.1 m) and maximum loaded draft of 9 ft. (2.7 m).

The vessel carries about 800 passengers seated and 175 cars, and has performed at the contractual deadweight of 340 tons at 40 knots.

With a superstructure designed credit-

ed to Sergio Pininfarina, and interiors by Vittorio Garroni Carbonara, Superseacat's propulsion package is based on four diesel engines and four steering water-jets.

March 11, 1999 was an instrumental day at Rodriguez Cantieri Navali S.p.A. with two major events occurring — the



Rodriguez Cantieri Navali  
Segesta Jet.

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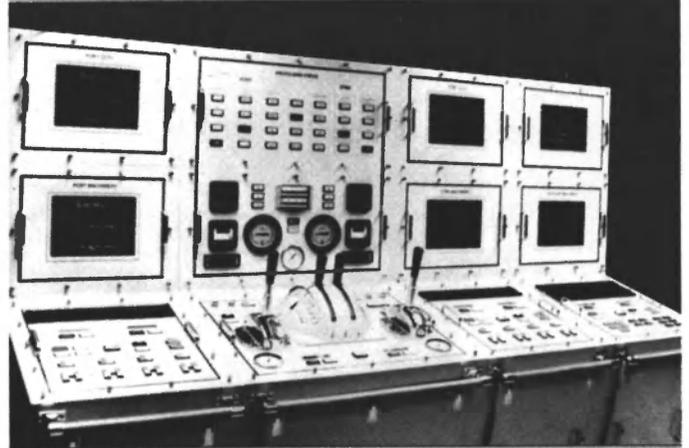


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Fincantieri MDV 3000  
Jupiter "Capricorn"

delivery of newbuild Segesta Jet and the signing of a License Agreement with Swiftships for the construction of Rodriquez fast ferries in the U.S.

The first of three vessels, Segesta Jet, an Aquastrada TMV 50, was delivered to the Ferrovia dello Stato (Italian State

Railways) for navigation on the Messina, Sicily to Reggio Calabria. Equipped with a 10 knots bowthruster, driven by a hydraulic motor, the vessel reaches a maximum speed at full load of 30 knots and is fitted with the Rodriquez Stabilizing System SMS (Seaworthiness Management System) for extra passenger comfort during rough seas.

The recent License Agreement with Swiftships shipyard in Louisiana encompasses an initial construction focus of two monohulls — a 177 ft. (54 m) passenger only and 249 ft. (76 m) car/passenger, boasting full load speed of up to 62 knots, depending on engines installed.

Other newbuilds recently delivered by Rodriquez include hydrofoil, Adriana, to Ustica Lines for operation between Naples and Trapani, Egadi Islands and a pair of monohulls — two Aquastrada TMV 70s, Isola Di Capri and Isola Capraia, launched September and November 1998, respectively.

#### Equipped To Supply The Best

On the equipment side, Effer's Marine division leads the way with an 18.5 percent increase on marine crane production and a 20 percent increase on marine crane turnover during 1998.

The past year was also one of further consolidation of Effer on the British and Dutch markets, where the company now leads in the sector of knuckle boom marine cranes. In fact, during the past year alone, Effer supplied five cranes to the Turkish Navy, and plans to deliver two more units by the middle of the year.

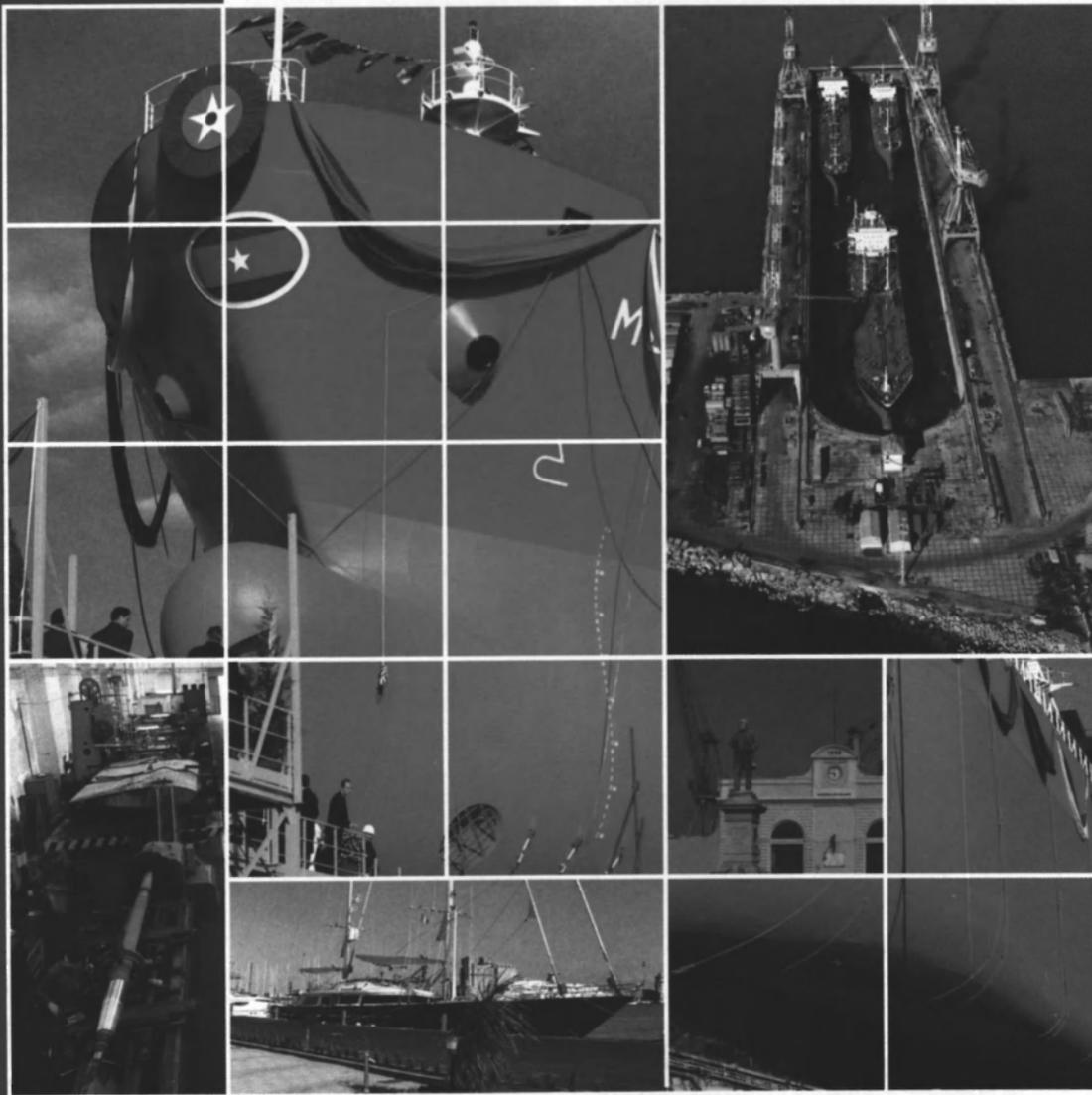
Effer also introduced two units of the new BL range during 1998. These heavy-duty knuckle-boom cranes were sent to Spain for two new hydrographic survey vessels. The BL range mirrors the definite approach of Effer to a more advanced market, namely heavy-duty or offshore cranes, a literally Naval sector.

Known for its manufacturing of aircraft seats, Geven has found a lucrative niche in the high-speed-at-sea market. The first supply was for Rodriquez on the Aquastrada fast ferries ordered by Tourship (Lota Group) — followed by another one for Inma (seats for two of Tourship's twin vessels).

Geven's seats were also chosen for two ferries constructed by the French shipyards of Leroux and Lotz, as well as for three of Fincantieri's fast ferries ordered by Ocean Bridge.

Presently, Geven is aiming to consolidate its presence in Europe — a new agreement regarding 5,000 seats will be signed in the near future with an important European group. The company also plans to delve into the increasing Aus-

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OTS/ADV

shipbuilding market.

Giumma, a producer of prefabricated units and bathrooms for the marine segment, is currently taking on the building market with a strong investment campaign to increase production capability in three ways: doubling the factory, investing \$1.3 million in industrial automation and organizing the company accordingly. These strategic decisions are ones that meet the production capabilities required by the passenger ship segment.

In recent news, Giumma, which also works in the railway and civil markets, is ready to extend its business from Europe into both the Asian and American markets with the construction of a new office. Adding on 6,000 sq. m. the new building will be ready by the middle of next year.

This industrial automation will allow Giumma to raise production, maintaining the high quality level and reducing costs as a result of the large push down of the margins due to the competitive environment.

#### Ports

Dubbed as Europe's natural gateway to the Mediterranean, Genoa's port is one of the city's greatest means of wealth.

A joint venture of public and private entities for the development of tourism, Cruise Genoa melds together both public bodies and private sector companies who cooperate in the cruise industry: the Region, the City Council, the Province and the Chamber of Commerce — to name a few.

"The principal aim is to encourage cruise and ferry traffic in Genoa, and consequently, to boost tourism and generate positive repercussions for the whole area," says **Maria Paola Profumo**, the Region's minister of tourism.

Established in 1997, Cruise Genoa is "A non-profit making consortium that integrates the efforts of all businesses to attract tourism," explains **Carlo Repetti**, Genoa's councilor for tourism.

Presently, 2.5 million passengers use the Port each year — and traffic is slated to increase even further.

Cruise Genoa also provides a Welcome Card, entitling passengers to discounts and a full range of services offered by the city, including a variety of stores and restaurants.

Comprised of 25 category home-based companies found in all the ports of Italy, Federagenti celebrated its first fifty years with an event at the Excelsior Palace Hotel in Rapallo last month.

The group's chairman, **Giorgio Fanfani**, discussed the current situation of maritime transport and the effects of trends on international competition.

Highlights of the conference were: The problems implicit in the liberalization of coasting and the introduction of the International Shipping Register, which includes 190 out of 250 ships, 4.3 million out of 5.5 million tonnage.

Although it was five months late, Disney Wonder and sistership Magic have left an indelible mark on the cruise industry.



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## New Ship Contracts

Shipowner/Operator	SO Country	Shipyard	Type	No.	DWT	GT	Deliv
TAUBATKOMPANIET	NETHERLANDS	DALIAN NEW	AHTS	1	0	2,500	2000
SINCERE NAVIGATION	HONG KONG	HALLA	BULK CARRIER	1	170,000	0	2000
TAI CHONG CHEANG							
STEAMSHIP (TCC)	HONG KONG	HALLA	BULK CARRIER	1	170,000	0	2000
NS LEMOS	GREECE	CHINA SHIPB.	BULK CARRIER	2	164,500	0	2000
ITALIAN INTEREST	ITALY	HALLA	BULK CARRIER	1	75,000	0	2001
SEA TRADE SHIPPING	GREECE	SAMHO SHIPYARD	BULK CARRIER	1	75,000	0	2001
KLAUS OLDENDORFF	GERMANY	SAMHO SHIPYARD	BULK CARRIER	1	75,000	0	2001
TARGET MARINE	GREECE	HALLA	BULK CARRIER	1	75,000	0	8/00
DIAMANTIS LEMOS	U.K.	HUDONG SY	BULK CARRIER	1	74,500	0	11/00
TOMASOS	GREECE	HUDONG SY	BULK CARRIER	1	74,500	0	12/0
KLAUS OLDENDORFF	GERMANY	HALLA	BULK CARRIER	2	74,000	0	2000
TAIWANESE INTERESTS	TAIWAN	TSUNEISHI	BULK CARRIER	3	52,000	0	00/01
LEVANT MARITIME	GREECE	SANOYAS	BULK CARRIER	5	52,000	0	—
NORDEN	DENMARK	OSHIMA SY	BULK CARRIER	1	50,800	0	2001
DIAMOND CAMELLIA	JAPAN	HAKODATE DOCK	BULK CARRIER	1	31,800	0	1999
DIOCLETIAN SHIPPING	COATTA	SPLIT	BULK CARRIER	4	8,500	0	00/01
AVRA SHIPMGMT.	GREECE	CHINA SHIPBLDG	BULK CARRIER				
			ORE STRNED	2	164,000	0	2001
STAMCO SHIPMGMT.	GREECE	GDYNIA	CAR CARRIER	2	21,000	0	2000
BUTTNER AND GILS	GERMANY	JIANGYANG	CHEM TANKER	2	13,500	0	2000
FARUK URKMEZ	TURKEY	CELIKTEKNE					
		SANAYII	CHEM TANKER	1	6,500	0	2000
FARUK URKMEZ	TURKEY	CELIKTEKNE					
		SANAYII	CHEM TANKER	1	6,500	0	2000
NORD CAPITAL	GERMANY	SAMSUNG	CONTAINER	2	67,500	0	00/01
FARUK URKMEZ	TURKEY	TORGEM GEMI	CONTAINER	2	0	8,600	—
FARUK URKMEZ	TURKEY	CELIKTEKNE					
		SANAYII	CONTAINER	2	0	8,600	—
KLAUS OLDENDORFF	BELGIUM	FULTON HEMIK	CONTAINER	1	0	0	2000 3.7
NEPTUNIA COMPANHIA	BRAZIL	ILHA SHIPYARD	CONTAINER	2	0	0	00/01 10
UNKNOWN	-	JURONG	CONTAINER	6	0	0	- 154.
REEDEREI B. RICKMERS	GERMANY	HANJIN	CONTAINER	8	0	0	00/01 16
COSCO	CHINA	IMABARI SY	CONTAINER	3	0	0	2000 —
PRINCESS CRUISES INC.	U.S.	MITSUBISHI H.I.	CRUISE SHIP	2	0	109,000	2000 —
CARNIVAL CRUISE LINE	U.S.	KMY	CRUISE SHIP	1	0	84,000	2001 375
AM. CLASSIC VOYAGES	U.S.	ATLANTIC MARINE	CRUISE SHIP	2	0	3,200	2001 60
NCL HOLDING	NORWAY	LLOYD WERFT	CRUISE SHIP	1	0	0	6/01 351
GRANDI NAVI VELOCI	ITALY	NUOVI CANTIERI					
		APUANIA	FAST FERRY	2	8,000	40,000	02/03 280
GRANDI NAVI VELOCI	ITALY	APUANIA NC	FERRY	2	0	40,000	5/02 276
CONSERVAS GARAVILLA	SPAIN	ASTILLEROS					
		MURUETA	FISHING	1	2,200	0	2000 —
SPANISH OWNER	SPAIN	BALENCIAGA	FISHING	2	0	0	2000 —
IRISH INTERESTS	IRELAND	VISSER OF					
		DEN HELDER	FISHING	1	0	0	2000 —
REMOY SEA VIKING	NORWAY	ORSKOV	FISHING	1	0	0	2000 —
MISC	MALAYSIA	MITSUBISHI H.I.	LNG	1	68,200	0	2002 179
MISC	MALAYSIA	MITSUBISHI H.I.	LNG	1	68,200	0	2002 178
WOODS HOLE	U.S.	DEREKTOR SY.	PASS/FERRY	1	0	350	2000 —
AL-SHAM SHIPPING	SYRIA	IIANG JIANG	MULTI-PURPOSE	2	10,000	0	—
BRIDGEPORT/PORT JEFF.	U.S.	EASTERN SY	PAS./VEH FERRY	1	0	1,500	2000 15
REMOY MANAGEMENT	NORWAY	SOVIKNES VAERFT PSV		1	0	0	2000 —
DUNYA DENIZCILIK	TURKEY	ONOMICHI	PROD TANKER	2	46,500	0	2000 52
SEARLAND SHIPPING	AUSTRIA	DAEDONG SY	PROD TANKER	1	35,000	0	2000 21.5
TALITA SHIPPING	COSTA RICA	DAEDONG SY	PROD TANKER	1	35,000	0	- 21.5
NORDEN TANKERS	DENMARK	DAEDONG SY	PROD TANKER	2	35,000	0	2000 41.4
A. P. MOLLER	DENMARK	GUANGZHOU	PRODTANKER	2	35,000	0	2001 46.8
D'ALITA	ITALY	DAEDONG SY	PROD TANKER	2	35,000	0	2000 43
AL-LAA SHIPPING CO	-	DALIAN SHIPYARD	PROD TANKER	1	12,000	0	2001 —
AL-LAA SHIPPING CO	-	DALIAN SY	PROD TANKER	1	7,200	0	2001 —
STENA RO-RO	SWEDEN	DALIAN SY	RORO	2	12,300	0	2001 66
LLOYD SARDEGNA	ITALY	SZCZECIN SY	RORO	2	7,400	0	2002 70
MOBY LINES	ITALY	DAEWOO	RORO / FERRY	2	0	0	2001 176
DREDGING CORP	INDIA	IHC HOLLAND	SH DREDGER	2	5,300	0	2001 —
KIRSTEN NAVIGATION	GREECE	DAEWOO	TANKER	1	300,000	0	2000 —
NITC	IRAN	HHI	TANKER	5	300,000	0	01/02 410
SCORPIO SHIPMGMT	MONACO	3 MAJ	TANKER	3	81,500	0	—
REMOLQUES Y NAV.	SPAIN	ASTILLEROS ZAMACONA	TUG	1	180	0	2000 —

Ferlship is a strategic consultancy highly specialized in market researches guided to the shipping industry. For additional information, please contact Ferlship @: 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

Maritime Reporter/Engineering News

## Appointments Announced At Farrell Lines

Farrell Lines Incorporated has elected the following appointments to positions at the company's North American operations in New York City: **Charles W. Boyle** appointed director, Strategic Marketing - Mediterranean Division; **James P. Cassidy** becomes director, North America Sales; and **James Madden** assumes the position of director of Preference Cargoes.

## Hale Hamilton Develops Quick Escape

U.S.-based Hale Hamilton have created a unique system of valves and controllers under contract by the Connecticut shipyard of the Electric Boat Corporation. Designed for the purpose of facilitating an emergency escape system, the product was recently adopted by the U.S. Navy.

The escape trunks, which allow submariners a safe escape route from depths up to 600 ft. (180 m), will be equipped with Hale Hamilton controllers and valves up to six trunks on each submarine. The system includes a small valve fitted to the submariners' lightweight escape suit worn upon entering the trunk.

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## Therm Offers Technical Data Guide

Therm Corporation is offering free Technical Data explaining correct procedures for shutting down closed-loop thermal oil systems. The bulletin, which concentrates on normal system operation and how to bleed the fuel in case of a power interruption or pump failure, also instructs and details the recommended procedure for properly shutting a system down to avoid stressing both the equipment and thermal oil.

Circle 50 on Reader Service Card

## Roger Simpson Design Garners Award

Based in London, Roger Simpson Design was recognized for its work on Cenargo, Dawn Merchant and the Merchant in the category of "Outstanding Interiors 1998" by ShipPax Information of Sweden. Honored for their work that began in each vessel's pre-contract stage, the company was responsible for space planning and development, detailed design, finishing, lighting and signing schemes.

## Deerberg Systems Welcomes Altenberg

Principal Ing Claus Altenberg has joined Deerberg Systems as head of design and engineering. Altenberg will be directly responsible for the company's technical department, inclusive of design, engineering, construction and product development.

## NIM Named Distributor For Fuel Mag

Northeast Industrial Marine Inc. (NIM) has been named the regional distributor in the northeast and midwest for Fuel Mag, a high-tech diesel fuel decontamination unit manufactured in New England. The product is distributed exclusively in the United States and South America by Fuel Dynamics L.L.C. Fuel Mag is a magnetic fuel conditioner that is installed in the fuel line between the diesel tank and the primary filter. The device breaks up microbial contamination, which is a chronic and costly problem common in diesel powered systems into particles small enough to pass through fuel filters harmlessly and burn cleanly in the combustion engine. Fuel Mag comes in seven standard sizes, from .25-in. to two in., depending on the size of the fuel line.

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## ABB Forms International Management Consulting Element

With specific emphasis concentrating on techniques to link business strategy and business process capabilities, ABB has formulated its newest business unit for Management Consulting.

Based in Baden, Switzerland (ABB Business Services Ltd) and Hunt Valley, Md., (ABB Automation Inc.), the venture will provide consulting services that highlight a complete enterprise view of strategies, processes and information technology and automation resulting in utmost shareholder value for ABB clients.

Offering comprehensive business solutions and implementation based upon ABB global expertise, the company plans to establish additional offices throughout Europe and the Americas.

Circle 7 on Reader Service Card

## Jotun Paints Acquires Jotun Valspar

Jotun Paints Group expanded its activities in North America with the recent acquisition of Jotun Valspar, in Baltimore. Jotun Valspar had been the sole outlet for Jotun marine coatings in N. America, with several U.S.-based contracting companies as major customers, and a major player within this field in the Middle and Far East. The Group plans to expand its marine, protective paint coatings for offshore in the U.S. market. Currently, it offers support services for owners dealing with protection problems; the services can include project assessment, preparation, and monitoring.

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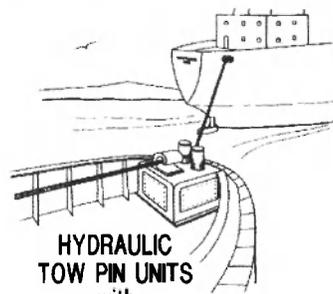
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## PORT CAPTAIN

Lasco Shipping Company, operator of a fleet of 24 bulk carriers, currently has an immediate opening for a Port Captain at its Pacific Northwest headquarters.

This position performs various management and oversight duties related to vessel operations, loading and maintenance, and acts as company liaison between corporate management, vessel officers and Lasco customers. Requirements include: Bachelor's degree from a maritime college or equivalent; at least 5 years of seagoing experience as a Master; experience navigating dry-bulk vessels or tankers in a variety of sea conditions; and experience implementing QSM per ISO 9002 and IMO/ISM requirements. Panamax experience is preferred.

Qualified applicants should submit a resume, cover letter and salary history to:

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Fax: (503) 321-2649 • e-mail: [hr@schm.com](mailto:hr@schm.com)

Lasco Shipping Company is an Equal Opportunity Employer.

Circle 323 on Reader Service Card

# Marine Diesel Engine Guide

(MaK Motoren, continued from page 38)

Website: <http://www.mak.de>

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
M20	200	300	4	6,8,9L	155-190	900-1000	21.9-24.2	9-10	930-1710
M25	255	400	4	6,8,9L	290-300	720-750	23.7-23.5	9.6-10	1740-2700
M32L	320	480	4	6,8,9L	480	600	24.9	9.6	2880-4320
M32V	320	420	4	12,16V	461	720-750	22.7	10.1-10.5	5530-7680
M43L	430	610	4	6,7,8,9L	900	500-514	24.4-23.7	10.2-10.5	5400-8100
M43V	430	610	4	12,14,16,18V	900	500-514	24.4-23.7	10.2-10.5	10800-16200
M552C	450	520	4	6,8L	750	500-514	21.8-21.2	8.7-8.9	4500-6000
M601C	580	600	4	6,8L	1167-1250	400-425	22.1-22.3	8.0-8.5	7000-10000

## MAN B&W Diesel AG

Postfach 100080  
Augsburg D-86135 Germany  
Tel: 011-49-821-3220  
Fax: 011-49-821-322-3382

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
L27/38	270	380	4	5,6,7,8,9L	300-340	720-800	23.0-23.5	9.1-10.1	1500-3060
L/V32/40	320	400	4	46,7,8,9,11,12,14,16,18V	480	720-750	23.9-24.9	9.6-10	2880-7680
L40/54	400	540	4	6,7,8,9L	700-720	500-550	23.2-24.8	9-9.9	4200-6480
L48/60	480	600	4	46,7,8,9L 12,14,16,18V	1050	500-514	22.6-23.2	10-10.3	1680-6300
L58/64	580	640	4	6,7,8,9L	1300-1390	400-428	23	8.5-9.1	8340-12510

## MAN B&W Diesel AS

Tegholmegade 41  
Copenhagen SV DK-2450 Denmark  
Tel: 011-45-31-492501  
Fax: 011-45-33-85-10-30  
Email: [alpha@manbw.dk](mailto:alpha@manbw.dk)

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
L35MC	350	1050	2	24,5,6,7,8,9,10,11,12	440-650	178-210	14.7-18.4	7.35	2600-7800
L42MC	420	1360	2	24,5,6,7,8,9,10,11,12	480-995	132-176	11.5-18.0	8	3980-11940
L50MC	500	1620	2	4,5,6,7,8	640-1330	111-148	10.9-17.0	8	5320-10640
L60MC	600	1944	2	4,5,6,7,8	920-1920	92-123	10.9-17.0	8	7680-15360
L70MC	700	2268	2	4,5,6,7,8	1355-2830	81-108	11.5-18.0	8.2	11320-22640
L80MC	800	2592	2	24,5,6,7,8,9,10,11,12	1750-3640	70-93	11.5-18.0	8	14560-43680
L90MC-C	900	2916	2	26,7,8,9,10,11,12	2340-4890	62-83	12.2-19	8.1	29340-58680
S26MC	260	980	2	24,5,6,7,8,9,10,11,12	275-400	212-250	14.8-18.5	8.2	1600-4800
S35MC	350	1400	2	24,5,6,7,8,9,10,11,12	505-740	147-173	15.3-19.1	8.1	2960-8880
S42MC	420	1764	2	24,5,6,7,8,9,10,11,12	730-1080	115-136	15.6-19.5	8	4320-12960
S46MC-C	460	1932	2	4,5,6,7,8	880-1310	108-129	15.2-19.0	8.3	5240-10480
S50MC	500	1910	2	4,5,6,7,8	690-1430	95-127	11.5-18.0	8.1	5720-11440
S50MC-C	500	2000	2	4,5,6,7,8	760-1580	95-127	12.2-19.0	8.5	6320-12640
S60MC	600	2292	2	4,5,6,7,8	980-2040	79-105	11.5-18.0	8	8160-16320
S60MC-C	600	2400	2	4,5,6,7,8	1085-2255	79-105	12.2-19.0	8.4	9020-18040
S70MC	700	2674	2	4,5,6,7,8	1350-2810	68-91	11.5-18.0	8.1	11240-22480
S70MC-C	700	2800	2	4,5,6,7,8	1490-3105	68-91	12.2-19.0	8.5	12420-24840
K80MC-C	800	2300	2	26,7,8,9,10,11,12	2470-3610	89-104	14.4-18.0	8	21660-43320
S80MC	800	3056	2	4,5,6,7,8,9	1840-3840	59-79	12.2-19.0	8	15360-34560
K90MC-C	900	2300	2	26,7,8,9,10,11,12	3100-4560	89-104	14.4-18.0	8	27360-54720
K90MC	900	2550	2	24,5,6,7,8,9,10,11,12	2200-4570	71-94	11.5-18.0	8	18280-54840
S90MC-C	900	3188	2	6,7	3140-4890	61-76	15.2-19.0	8.1	29340-34230
K98MC-C	980	2400	2	26,7,8,9,10,11,12	4130-5710	94-104	14.6-18.2	8.3	34260-68520
K98MC	980	2660	2	26,7,8,9,10,11,12	4090-5720	84-94	14.6-18.2	8.3	34320-68640

## MAN B&W Diesel AS Holeby

Ostervej 2  
Holeby DK-4960 Denmark  
Tel: 011-45-53-906026  
Fax: 011-45-53-906676  
Email: [alpha@manbw.dk](mailto:alpha@manbw.dk)

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
L-V28/32H	280	320	4	5,6,7,8,9L	210-220	720-750	17.8-17.9	7.7-8	1045
L16/24	160	240	4	46,7,8,9L 12,14,16V	480	720-750	23.9-24.9	8-9.6	2880-7680
L23/30H	225	300	4	6,7,8,9L	700-720	500-550	23.1-24.8	7.2-9	4200-6480
L32/40	320	400	4	46,7,8,9L 12,14,16V	1050	500-514	22.6-23.2	9.6-10	6300-1680

## MAN B&W Diesel AS-Alpha Diesel

Niels Juels Vej 15  
Frederikshavn DK-9900 Denmark  
Tel: 011-45-9620-4100  
Fax: 011-45-9620-4030  
Email: [alpha@manbw.dk](mailto:alpha@manbw.dk)

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
L23/30A	225	300	4	6,8L	133-160	825-900	16.3-17.9	8.25-9	800-1280
V23/30A	225	300	4	12V	160	900	17.9	9	1920
L27/38	270	380	4	6,7,8,9L	340	800	23.5	10.1	2040-3060
L28/32A	280	320	4	6,7,8,9L	245	775	19.3	8	1470-2205
V28/32A	280	320	4	12,16V	245	775	19.3	8	2940-3920
S26MC	260	980	2	24,5,6,7,8,9,10,11,12L	275-400	212-250	14.8-18.5	8.2	1600-4800
L35MC	350	1050	2	24,5,6,7,8,9,10,11,12L	440-650	170-210	14.7-18.4	8.8	2600-7800
S35MC	350	1400	2	24,5,6,7,8,9,10,11,12L	605-740	147-173	15.3-19.1	8.1	2960-8880
L42MC	420	1360	2	24,5,6,7,8,9,10,11,12L	480-995	132-176	11.5-18	8	3980-11940
S42MC	420	1764	2	24,5,6,7,8,9,10,11,12L	695-1025	115-136	14.5-18.5	8	4320-12960
S46MC-C	460	1932	2	4,5,6,7,8L	880-1310	106-129	15.2-19	8.3	5240-10480
L50MC	500	1620	2	4,5,6,7,8L	640-1330	111-148	10.5-17	8	5320-10640
S50MC	500	1910	2	4,5,6,7,8L	690-1430	95-127	11.5-18	8	5720-11440
S50MC-C	500	2000	2	4,5,6,7,8L	760-1580	95-127	12.2-19	8.5	6320-12640

## MAN Engines & Components

595 S.W. 13th Terrace  
Pompano Beach, Fla. 33069  
Tel: 800-MAN-2842  
Fax: 954-946-9098  
Email: [man@man-mec.com](mailto:man@man-mec.com)

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
D0826LE40	108	120	4	6L	45	2100-2600	13.9	10.4	147-270
D2866E	128	155	4	6L	31	1500-2200	8.4	11.37	125-185
D2866TE	128	155	4	6L	39	1800-2200	10.7	11.37	190-235
D2866LE40	128	155	4	6L	54	1800-2200	14.8	11.37	250-324

D2866LE402	128	155	4	6L	61	2200	16.8	11.37	
D2866LE403	128	155	4	6L	61	2100	17.6	10.85	
D2866LE405	128	155	4	6L	75	2200	20.5	11.37	
D2848LE	128	142	4	8V	43	1800-2300	12.4	10.89	
D2848LE401	128	142	4	8V	63	2100-2300	17.8	10.89	
D2848LE403	128	142	4	8V	74	2300	21	10.89	
D2848LE405	128	142	4	8V	60	2100	18.7	9.94	
D2840LE	128	142	4	10V	59	2300	12.4	10.89	
D2840LE401	128	142	4	10V	60	2300	17.2	10.89	
D2840LE402	128	142	4	10V	44	1800	16.1	8.52	
D2840LE403	128	142	4	10V	77	2300	22	10.89	
D2842LE	128	142	4	12V	43	1800-2300	12.4	10.89	
D2842LE401	128	142	4	12V	61	2100-2300	17.5	10.89	
D2842LE402	128	142	4	12V	67	2300	19.2	10.89	
D2842LE403	128	142	4	12V	44	1800	16.1	8.52	
D2842LE404	128	142	4	12V	80	2300	22.8	10.89	
D2842LE406	128	142	4	12V	74	2300	21	10.89	
D2842LE408	128	142	4	12V	61	2100	19.2	9.94	

## MAN Nutzfahrzeuge AG, Nuremberg Works

Tugenerweinstr. 53  
Nuremberg D-90441 Germany  
Tel: 011-49-911-420-0210  
Fax: 011-49-911-420-1915

Email: [brigitte-moehler@mn.man.de](mailto:brigitte-moehler@mn.man.de)  
Website: <http://www.man-nutzfahrzeuge.de>

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
D2866E/TE/LE	128	155	4	6L	27.5-41.7	1800-2200	7.9-13.9	9.3-11.37	
D2866LE/402/3/5	128	155	4	6L	61.3-74.8	2100-2200	17.5-20.5	10.85-11.37	
D2848LE/401/403/5	128	142	4	8V	35-73.5	1800-2300	12.8-21	8.52-10.9	
D2840LE/1E401/2/3	128	142	4	10V	34.6-77.2	1800-2300	12.6-22	8.52-10.9	
D2842LE/401/2/3/4/6/8	128	142	4	12V	35-79.7	1800-2300	12.8-22.8	8.52-10.9	

## MTU Friedrichshafen

Postfach 2040  
Friedrichshafen D-88040 Germany  
Tel: 011-49-7541-90-3381  
Fax: 011-49-7541-90-3945

Email: [ebenhoch@mtu-friedrichshafen.de](mailto:ebenhoch@mtu-friedrichshafen.de)  
Website: <http://www.mtu-friedrichshafen.com>

Model	Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM
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## Marine Releases Lube Oil Test Kit

Marine has launched its lube oil for onboard oil analysis. Boasting company's combi-check feature, the new device is able to measure both water content and base number, providing easy-to-use digital read outs. Combi-check then stores and numbers the previous test for display beside current measured value. The kit also includes BP's test for insoluble, and viscosity.

Circle 18 on Reader Service Card

## MWH Inaugurates State-Of-The-Art Manufacturing Plant

Merkisches Werk Halver (MWH), a fully operating specialist for cylinder head components, marked the official opening of its modernized manufacturing plant in Großbodungen in May. Jürgen Ludwиг, who has been with Merkwisches Werk for 10 years, will head the marketing department of MWH. He Lothar Wizisk will replace Peter Hoffmann as managing director of the company's Großbodungen loca-

Circle 52 on Reader Service Card

## SAE Elects New President

Kentaro Aikawa, chairman of Mitsubishi Heavy Industries (MHI), was appointed president of the Japan Shipbuilders' Association at the organization's Annual General Meeting last month. Aikawa previously served as chairman of the Shipbuilders' Association of Japan (SAJ) since 1997.

## PINPOINT Laser Systems Introduces New System

Complete with a computer interface that allows the receiver to speak with a laptop or PC and PINPOINT's new Data Capture Software, the company has established its newest — the Enhanced Microgage Machinery Alignment Kit — innovative measuring and alignment system developed for industrial applications.

The Enhanced Microgage Kit includes a compact, battery powered, laser transmitter that projects a thin line of laser light forming a centerline reference. The kit also offers a mounting tripod, leveling base for setting exact planes and a beam alignment mirror. A digital receiver is moved along the laser beam and provides a precise measure of

receiver orientation on a digital display. Applications include measuring of cutting and milling machinery alignment and performance, equipment installations and shaft alignment.

Circle 53 on Reader Service Card

## Pumper Parts Introduces Its Newest Product Line

Pumper Parts, based in Export, Pa. has been inaugurated as one of the newest

global suppliers of replacement parts for air-operated double diaphragm pumps. Offering a complete line of fluid side replacement parts and repair kits fitted for Warren Rupp® and ARO® pumps, the company's additional products include valve balls, valve seats, gaskets and O-rings.

## Kamewa America Selects New Sales Manager

Kamewa America, a subsidiary of Kamewa, has appointed Charles A. Hall as sales manager.

A qualified marine engineer with 37 years of experience in the international maritime industry, Hall will provide support to the company's already implemented sales programs, as well as concentrating on the expansion and development of new maritime business markets within the Americas.

# The Crucial Move

They say that when the masters play, the game is won or lost in the first few moves.

Though the marine business is certainly no game, the same holds true. The success of your business hinges on the wisdom of your decisions.

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# 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.

## ONING AND REFRIGERATION - allation, Equipment & Services

ne, Box 1043, S-436 21 ASKIM SWEDEN  
81 Mahan St., West Babylon, N.Y. 11704  
ration Co., 2323 Randolph Ave., Avenel, NJ 07001  
old, P.O. B. 4805, Syracuse, NY 13211  
Resources, 210 Westside Ave., Jersey City, NJ 07305  
, 81 Mahan St., West Babylon, N.Y. 11704  
ration, 2323 Randolph Ave., Avenel, NJ 07001  
geration, 533 N.Fries Ave., Wilmington, CA 90744  
ervice Inc., 2375 West Esther Street, Long  
0813  
a, 47 boul. Marie Victorin, Candiac, Quebec,  
1 B6

## SIGNALLING EQUIPMENT

Marine, P.O. Box 358, Two Rivers, WI 54241  
**ACTORY MUTUAL-APPROVED**  
urine Products Inc., Unit 100 18 Gostick Pl.,  
r, Canada V7M3G31  
A Asbury Commons Dr., Atlanta, GA 30338

## BOATS

agle Mfg., P.O. Box 597, La Conner WA 98257  
lg., P.O. Box 597, La Conner WA 98257

## AND CHAINS

nt'l., Inc., P.O. Box 498985, Cincinnati, OH 45249  
ry Dock Engineers Inc., P.O. B. 505804, MA 02150  
alboer Jr. BV, P.O.B. 5003, 3008 AA Rotterdam, Nether  
on Chain Inc., Box 3645, Seattle, WA 98124  
1 Supply Co., P.O. Box 596, Wilmington, CA 90748  
t, P.O.B. 29102, 3001 GC Rotterdam

## EERS

achinery, P.O. Box 19100, Houston, TX 77224  
lioneers, 2334 Willis Rd., Richmond, VA 23230  
ervices, 3702 Pender Dr. Ste.400, Fairfax, VA 22030

## SUAL LIGHTING DESIGN

t A.V.L., 721 E. El Segundo Blvd., El Segundo,  
45

## TION SYSTEMS

ic Design, 3020 20th St., Metairie, LA 70002-4911  
orp., 5700 Citrus Blvd., Suite E, New Orleans, LA 70123

## OT SYSTEMS

v marine Sys., 55 A Clipper St., Coquitlam,  
nada V3R 6X2  
y Communications, 2721 Discovery Dr., Raleigh, N.C.  
-1851

av Marine, 1915 Stainsburg Ave., Vancouver, B.C.  
DA

eon Marine Co., 676 Island Pond Rd., Manchester,  
3109

## ST

st Technologies, 4620 S. Coach Dr., 85714, Tucson, AZ  
nd Genstar Inc., Executive Plaza IV, Hunt Valley, MD  
2-1031

## T STRAINERS

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

## RY CHARGERS

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

**NG**—Rubber, Metallic, Non-Metallic  
m & Voss Industrie GmbH, P.O. B. 100720, D-2000  
nburg 1, GERMANY;

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

iko Ltd., Loudwater, High Wycombe, Bucks  
Hampshire ENGLAND HP109QV

hensberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241  
ion Corp., 1111 Cedar Creek Rd., Grafton, WI 53024

rdon Bearings Inc., 3225 Mainway, Burlington, Ont.,  
ANADA L7M 1A6

TN Bearing, 1600 E. Bishop Court, Mt. Prospect, IL 60056  
esco Plastics, P.O. B. 40647, Cleveland 2022 SOUTH  
FRICA

## IE SYSTEMS

ast Systems, 3240 N. Broadway, St. Louis, MO 63147-3515  
elson Div., Exhaust & Filtration Sys., Hwy. 51 West, P.O.  
Box 428, Stoughton, WI 53589

## CKS & RIGGING

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

## DGE WIPERS

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

## DKERS

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

## LKHEAD 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

Raiko Ltd., Loudwater, High Wycombe, Bucks  
Hampshire ENGLAND HP109QV

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

## BLE 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

## D/CAM SYSTEMS

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

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

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

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

MSA, 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

## CARGO MONITORING & CONTROL SYSTEM

lan-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 Trunpike,  
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

Corrodeal Inc., 545 Rainier Blvd., N #15, Issaquah, WA 98027

GMA Gamet, 6124 114th Ave., N.E. Kirkland, WA 98033

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

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

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

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

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

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

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

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

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

Dow Corning Corp., P.O. Box 994, Midland, MI 48668-0994

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 Sterox, Virgin  
Islands 00840

## COMMUNICATIONS SERVICE

Hose McCann, 1241 W. Newport Gender, Deerfield Beach,  
FL 33442

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

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

Chand Corporation, 157 Hwy 654, Mathews, LA 70375

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

Fleet Technology, 311 Leggett 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

## CONDENSERS/SEPARATORS

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

## CONSULTANTS

Hornblower Marine, Pier 3 Ferryboat Santa Rosa, San Francisco,  
CA 64111

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

## CONSOLE - QMDSS

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

lan-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

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

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

## CONVERSIONS & REPAIRS

Vancouver Shipyards, 55A 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., 8185 Cass Ave., Danien, IL 60561

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

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

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

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

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

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

## CRANE-HOIST-DERRICK-WHIRLEYS

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

Holly Hoist Corp., P.O. Box 86, St. 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, Biloxi MS  
39535-4454

Liebherr-Werk Nenzing GMBH, A-6710 Nenzig/Austria,  
Tschalenga 3, P.O. Box 10

Xtek, Inc., 11451 Reading Road, Cincinnati, OH 45241

## CRANKSHAFT DEFLECTION ANALYZER

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

## CRANKSHAFT QUINDING

Goltens, 160 Van Brunt St., Brooklyn, NY 11231

## CRANKSHAFT REPAIR

In-Place Machining, 1929 North Buffum St., Milwaukee, WI 53212

## CUSTOM CLOSURES

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

## CUTTING AND WELDING MACHINES

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

## CYLINDER LOAD ANALYZER

General Thermodynamics, 210 S. Meadow Rd., Plymouth,  
MA 02360

## DAVT SYSTEMS

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

Welin Lambie N.A. Inc., 18 Ridgecrest Drive, Bridgewater Nova  
Scotia, Canada B4V 3 V8

## DECK MACHINERY - Cargo Handling

Markay Machinery Co., Inc., P.O. Box 24788, Seattle, WA  
98124-0788

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

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

Leenstra Machine, P.O. Box 9, Drachten, Netherlands, 9200AA

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

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

E.H. O'Neill, 1405 Chippendale Rd., Lutherville, MD 21093

New England Trawler Equipment Co., 291 Eastern Avenue,  
Chelsea, MA 02150

Pusnes, PO Box 102, N-4818, Faervik, NORWAY

Schoelhorn-Albrecht, - P.O. Box 22110, St. Louis, MO 63116

Smith Berger Marine Inc., 7915 10th Ave. S., Seattle, WA 98108

Timberland Equipment, P.O. Box 490, Woodstock, Ontario  
N4S 7Z2 CANADA

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

**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  
Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook, VA 22624  
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  
Promar, 115 Industrial Blvd., Kearneysville, W. VA 25430  
Schuyler Rubber Co., 16901 Woodred Rd., Woodinville, WA 98072

**FILTERS/FILTER SYSTEMS**

Boll-Filter Corp., 15 Int'l Dr., E. Granby, CT 06026  
Kraissl Co., 299 Williams Avenue, Hackensack, NJ 07061  
Luber-Finer, Inc., 200 South 4th St., Albion, FL 62806-1313

**FIN STABILIZERS**

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  
Raikoo 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  
Nautical Safety Products, P.O. Box 590462, Houston, TX 77259  
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807  
Unitor Ship Service Inc., 2375 West Esther Street, Long Beach, CA 90813  
Grimmell Fire Protection Systems, 835 Sharon Drive, Westlake, OH 44145  
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, Osaka 555, 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  
Environmental Solutions Int'l, 11002 Raccoon Ridge, Reston, VA 20191-4911

**GALLEY EQUIPMENT**

Cospolich Refrigerator Co., 949 Industry Rd., Kenner LA 70062  
Jamestown Metal Marine Sales, Inc., 4710 Northwest Second Ave, Boca Raton, FL 33431  
Lang Manufacturing, P.O. B. 905, Redmond, WA 98073  
Marine Accommodations, Inc., 3830 Williamsburg Park Blvd., Building 7, Jacksonville FL 32257  
Richard Galley Supply, PO Drawer 4035, Houma, LA 70361

**GANGWAYS, LADDERS**

ACL Industries, 177 Gay St., Manchester, NH 03103  
Nautical Safety Products, P.O. Box 590462, Houston, TX 77259-0462  
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, 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**

Alaska Diesel, 4420 14th Ave., NW, Seattle, WA 98107  
Baylor Co., 500 Industrial Blvd., Sugarland, TX 77478  
Insulinde 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  
Sea, Inc., 7030 220th S.W. Mt. Lake Terrace, WA 98043

**HATCHES AND DOORS**

Railway Specialties Corp., 2979 State Rd., P.O. Box 29, Bristol, PA 19007

**HEAT EXCHANGERS**

Alfa-Laval Separation Inc., 955 Meams Rd., Warminster, PA 18974  
Beaird Industries Inc., P.O. Box 31115, Shreveport, LA 71130  
Compute (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**

Parathem Corp., 1050 Colwell Rd., Conshohecken, PA 19428

**HOISTS**

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

**HORNS/WHISTLES**

Airchime Mfg. Co. Ltd., 5478 267th Street, Gloucester Industrial Estate, Langley, B.C. Canada V4W 3S8  
Kahlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241  
Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062

**HYDRAULICS**

Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken, NJ 07030  
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 Infatables Boats, 410 Oak St., Friendsville, MD 21531  
Ocean Technical Services Inc., 1140 Peters Rd., Harvey, LA 70058-1705

**HYDRAULIC SYSTEM FLUSHING**

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

**HYDRAULIC TRAINING**

Consolidated Fluid Power, 155 Wright 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, Nordereibstrasse 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**

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

**INTERIORS**

Bauer Interiors, 733 Darie 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  
Marine 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 Ind., 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  
Marine Accommodations, Inc., 3830 Williamsburg Park Blvd., Building 7, Jacksonville FL 32257  
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031

**KEEL COOLERS**

R.W. Fernstrum & 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 Pearle Jensen Way, LaConner, WA 98257  
Avon Marine, 12125 Young River Ave., Fountain Valley, CA 92708  
DBC Marine Safety Systems, 12351 Bridgeport Rd., Richmond, B.C. CANADA V6V1J4  
Norsate 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 Marine 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

**LIFESAVING EQUIPMENT**

MGI International, 119-225 West 1st St., North Vancouver, B.C. CANADA

**LIQUID OVERFILL PROTECTION SYSTEMS**

E.R.L. Marine Products, P.O.Box 1026, New Albany, IN 47151  
King Engineering Corp., P.O. Box 1228, Ann Arbor, MI 48106

**LOGISTICS**

VL Logistics Consultants, Inc., 3420 Bienville Blvd., Ocean Springs, MS 39564

**MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING**

Golten Marine Co. Inc., 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  
Hornblower Marine, Pier 3 Ferryboat 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 CEILING**

Hydro-Aluminium, Vik Verk, N-5880 VIK | SOGN, Norway  
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807

**MARINE CONSULTANTS**

PCS Marine, 174 Colonnade Road S., Nepean, Ontario K2E715  
Hornblower Marine, Pier 3 Ferryboat Santa Rosa, San Francisco, CA 94111  
Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980  
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807  
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241  
Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062  
Lonsel Inc., 928 E. 238th St., Carson, CA 90742  
SlipNot Safety Flooring, 2545 Beaufait St., Detroit, MI 48207  
Marine Drilling & Blasting, Inc., P.O. Box 18098, Beverly Hills, CA 90209-4098  
Frank L. Beier Radio, 2001 Ridgeway Dr., Metairie, LA 70001  
Autronica USA, 234 Industrial Pkwy, Northvale, NJ 07647  
Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062  
Saab Marine Electronics AB, Box 13045, 402 51 Goteborg, 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 Marine Co., 676 Island Pond Rd., Manchester, NH 03109  
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY  
George G. Sharp, Inc., 100 Church St., New York, NY 10038  
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029  
Lake Shore Inc., P.O. Box 809, Iron Mountain, MI 49801, 1150 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  
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  
Debis Financial Services, 201 Merrit 7, Suite 70, Norwalk, CT 06856  
Autronica USA, 209 Industrial Pkwy, Northvale, NJ 07647  
Kahlenberg Bros., P.O. Box 358, Two Rivers, WI 54241  
Defense Reutilization & Marketing Service, 2163 Airways Blvd., Memphis, TN 38114  
Calhoun MEBA Engineering School, 27050 St. Michaels Road, Easton, MD 21601  
GSI Marine, 4016 Strawberry Road, Suite B, Pasadena, TX 77504-3050  
Marine Safety Int'l., Marine Terminal Laguardia Airport, NY 11371  
John Crane Marine, USA, 1536 Barclay Blvd, Buffalo Grove, IL 60089  
Selco USA, 2508 Lakebrook Ct., Atlanta, GA 30360  
Intercolor Corp., 2150 Boggs Rd., Deluth GA 30096  
Barco Int'l, 2558 Mountain Industrial Blvd., Tucker, GA 30084  
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851  
Datastar Marine Products Inc., Unit 100 18 Gostick Pl., N.Vancouver, Canada V7M3G3  
Phillystran, Inc., 151 Commerce Drive, Montgomeryville, PA 18936-9628  
Marine Safe Electronics, 37 Staffem Dr., Concord, Ontario L4K CANADA  
Band, Lavis, & Associates, 900 Ritchie Hwy, Suite 203, Severna Park, MD 21146  
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202  
Bay Engineering, 253 N. First Ave., Sturgeon Bay, WI 54235  
Donald L. Blount, 2550 Ellsmere Ave., Ste. K, Norfolk, VA 23513  
C. Baxter & Associates, P.O. Box 9006, Mobile, AL 36609  
CDI Marine Co., 9550 Regency Square Blvd. Ste. 400, Jacksonville, FL 32225  
Childs Engineering Corp., Box 333, Medfield, MA 02052  
Crandall Dry Dock Engrs., Inc., P.O. Box 505804, Chelsea, MA 02150  
Crane Consultants, 15301 First Ave S., Seattle WA 98148  
R.G. Cushing, 17 Vesey St., New York, NY 10007  
CT Marine, 56 Crooked Trail, Rowayton, CT 06853  
Cunningham & Walker, 1762 Providence Hollow Lane, Jacksonville, FL 32223  
Arthur D. Darden, 3200 Ridgeway Dr., Suite 400, Metairie LA 70002  
DeJong & Lebet, Inc., 1734 Emerson Street, Jacksonville, FL 32207  
Design Associates Inc., 14360 Chel Menteur Highway, New Orleans, LA 70129  
Designers & Planners, 2120 Washington Blvd. Ste.200, Arlington, VA 22204  
Enxon Mgmt. & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706  
Fleet Technology, 311 Leggett Dr., Karata, Ontario, Canada K2K 1Z8  
GHM Inc. (Ind. Measurement Consultants), P.O. Box 1836, Newport News, VA 23601  
Gibbs & Cox, Inc., 50 West 23rd St., New York, NY 10010  
Heger Dry Dock Engineers, Inc., P.O.B. 6605, Holliston, MA 01746  
John W. Gilbert & Assoc., Inc., 199 State St., Boston, MA 02109  
The Glosten Assoc. Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104  
Guido Peria & Assoc., 720 3rd Ave., Ste. 1200, Seattle, WA 98104  
Morris Guralnick Associates, Inc., 130 Sutter St., Ste. 400, San Francisco, CA 94104  
JHJ Inc., 3412 Progress Dr., Bensalem, PA 19020  
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073  
Kvaerner Masa Marine Inc., 201 Defense Highway, Suite 202, Annapolis, MD 21401  
James S. Krogen, 799 Brickell Plaza Ste. 701, Miami, FL 33131

Hornblower Marine, Pier 3 Ferryboat Santa Rosa, San Francisco, CA 94111  
Boland Industrial & Consulting Services, P.O.B. 91360, Mobile, AL 36691

**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  
Selby, P.O. Box 1600, Sapulpa, OK 74067  
Flexible Decking, 2708 N. Australian Ave. Ste. 9, West Palm Beach, FL 33407  
Lonsel 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 Ridgeway Dr., Metairie, LA 70001  
Autronica USA, 234 Industrial Pkwy, Northvale, NJ 07647  
Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062  
Saab Marine Electronics AB, Box 13045, 402 51 Goteborg, 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 Marine Co., 676 Island Pond Rd., Manchester, NH 03109  
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY  
George G. Sharp, Inc., 100 Church St., New York, NY 10038  
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

**MARINE EQUIPMENT**

Lake Shore Inc., P.O. Box 809, Iron Mountain, MI 49801, 1150 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  
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 SHAFTING**

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

**MARINE SURPLUS SALES**

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Calhoun MEBA Engineering School, 27050 St. Michaels Road, Easton, MD 21601  
GSI Marine, 4016 Strawberry Road, Suite B, Pasadena, TX 77504-3050  
Marine Safety Int'l., Marine Terminal Laguardia Airport, NY 11371

**MECHANICAL PUMP SEALS**

John Crane Marine, USA, 1536 Barclay Blvd, Buffalo Grove, IL 60089

**METERS**

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

**MONITORS**

Intercolor Corp., 2150 Boggs Rd., 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  
Datastar Marine Products Inc., Unit 100 18 Gostick Pl., N.Vancouver, Canada V7M3G3

**MOORING LINES**

Phillystran, Inc., 151 Commerce Drive, Montgomeryville, PA 18936-9628

**MOTOR PROTECTION EQUIPMENT**

Marine Safe Electronics, 37 Staffem Dr., Concord, Ontario L4K CANADA

**NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS**

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Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202  
Bay Engineering, 253 N. First Ave., Sturgeon Bay, WI 54235  
Donald L. Blount, 2550 Ellsmere Ave., Ste. K, Norfolk, VA 23513  
C. Baxter & Associates, P.O. Box 9006, Mobile, AL 36609  
CDI Marine Co., 9550 Regency Square Blvd. Ste. 400, Jacksonville, FL 32225  
Childs Engineering Corp., Box 333, Medfield, MA 02052  
Crandall Dry Dock Engrs., Inc., P.O. Box 505804, Chelsea, MA 02150  
Crane Consultants, 15301 First Ave S., Seattle WA 98148  
R.G. Cushing, 17 Vesey St., New York, NY 10007  
CT Marine, 56 Crooked Trail, Rowayton, CT 06853  
Cunningham & Walker,

J. Box 35690, Louisville, KY 40432  
Box 372, Milwaukee, WI 53201-0372,  
Box 185, 00381 Helsingki, FINLAND  
ER, INC., 1460 Livingston Avenue, N.  
Ltd., Box 220, SF-26101, Rauma,

ic., 106 Park Place, Suite 200, Covington, LA

1010, S-68129, Kristinehamn, Sweden  
Jh, "Aquamaster", Box 220, FIN-26101 Rauma,

. Box 370, N-6401, Molde, Norway  
I SW 42nd St., Ft. Lauderdale, FL 33132  
NE Adams Street, Peoria, IL 61629-2320  
85 Cass Ave., Darien, IL 60561  
International B.V., Postbus 320, 1969 NJ  
derland

, PO Box 492, Milwaukee, WI 53201-0492  
sel Engines Div.—GMT, Bagnoli della  
, Trieste, ITALY  
JM Diesels Inc., 10801 Kempwood Dr. Ste 1,  
77043-1412  
dvide, 160 Van Brunt St., Brooklyn, NY 11231  
r Marine Inc., 31777 Industrial Rd., Livonia, MI

Metall, 6720 124th Ave. Lennville, MI 49408  
Bros. Co., P.O. Box 358, Two Rivers, WI 54241  
. 7555 Danbro Crescent, Mississauga, Ontario,  
L5N 6P9  
, P.O. Box 6, 5150 BB Drunen, The Netherlands  
& Stofferfort, P.O. Box 1860, D-58408 Witten,

/ibration Control, 186 West 8th Ave., Vancouver, BC  
, V5Y 1N2  
, Inc., 91 Willenbrock Rd., Unit B4, Oxford CT 06478  
hes Werk, P.O. Box 1442, D-5884 Halver GERMANY  
&W Diesel, 17 State St., New York, NY 10004  
&W Diesel A/S, Ostervej 2, DK-4960 Holeby,

ARK

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nikshavn, DENMARK  
B&W Diesel GmbH, Stadtbachstrasse 1, D-86153

burg 1 GERMANY  
n Corp., 1111 Cedar Creek Rd., Grafton, WI 53024  
Wartsila Ab, Vasa and Abo Divisions, P.O. Box 244,  
35100 Vasa, FINLAND

mpulsion Systems Inc., 601 N.E. 26 Cr., Pompano Beach,  
, 33064  
chrl Sennar Inc., 25 W Third, Kenner LA 70062  
chottel-Werft, Manizer Strasse 99, D-56322 Spay/Rhein,  
GERMANY

schottel Inc., 500 Industrial Blvd., Sugar Land, TX 77478  
Siemens Electric Ltd., 1180 Courtneypark 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

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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 98107

Kraissl Co., 299 Williams Avenue, Hackensack, NJ 07061  
Vita Motivator, 566 Parker St., Newark, NJ 07104  
Alfa Tec Inc., 4027 21st Ave. West, Seattle WA 98199

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Scotia, Canada B4V 3V8

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Fast Systems, 3240 North Broadway, St. Louis, MO 63147  
AlfaTec, Inc., 4027 21st Ave. West, Seattle, WA 98199

Owens Mfg., Hwy 92, Youngsville, LA 70592  
Byrne Rice & Turner, 1172 Camp St., New Orleans, LA 70130

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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  
Hajue, 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 Mobile Networks, 150 Metcalf St., Suite 1900, Ottawa,  
Ontario K2P 1P1 Canada

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

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IL 60089

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

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

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Corona, CA

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WA 98257

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Astilleros Espanoles, S.A. Ochandiano, 14-16 28023 El Plantio  
SPAIN

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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 Marine Co., P.O. Box 4113, New Orleans, LA 70178  
Blount Marine, 461 Water St., Warren, R.I. 02885

Bolling Lockport & Larose, P.O. Box 250, Lockport, LA 70374  
Caridoc, P.O. Box 1147 Port Of Spain, Trinidad, W.I.

Chris-Marine AB, P.O. Box 9025, S-2000 39, Malmo, SWEDEN  
Conrad Industries, 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

Goltens Worldwide, 160 Van Brunt St., Brooklyn, NY 11231  
Gulf Coast Fabrication, Inc., P.O. Box 539, Lakeshore, MS 39558

HDW, Kiel, Germany, USA Rep.; Roland Marine Inc., 90 Broad St.,  
NY, NY 10004

Halter Marine Group, Inc., 13085 Industrial Seaway Rd, Gulfport,  
MS 39503

Hitachi Zosen, Hitachi Shipbuilding & Engineering Co., 1-1-1  
Hitatsubashi Chiyoda-Ku Tokyo 100 Japan

In-Place Machining Co., Inc. 929 North Bufum Street, Milwaukee,  
WI 53212-3793

Jacksonville Shipyards, 750 E. Bay St., Jacksonville, FL 32202  
Jeffboat, Inc., P.O. Box 610, Jeffersonville IN 47130

Kvaerner Masa-Yards Oy, Box 132, SF-00151, Helsingki, FINLAND  
Leveac Shipyards, P.O. Box 1190, HWY 90 East, Jennings, LA  
70546

Lindenaу GmbH, Skagerrakerufer 10, Postfach 9093 D-2300 Kiel,  
Friedrichsort GERMANY

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 AR 71655  
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 Shipyard, Inc., P.O. Box 742, Bayou la Batre, AL 36509  
Swath Ocean, 979 G Street, Chula Vista, CA 92011

Talleres Navales del Golfo, Islote San Juan de Ulva S/N, 91800  
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Westport Shipyard, P.O. Box 308, Westport, WA 98595

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Zodiac of North America Inc., Thompson Creek Rd., P.O. Box 400,  
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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  
TX 77102

FirstWave/Newpark Shipbuilding, 2102 Broadway, Houston  
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Cascade General Inc., 5555 N. Channel Ave., Bld. 71, Portland,  
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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  
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Marine Safety, Marine Air Terminal, Laguardia Airport, NY 11371

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Summer Equipment, 24 West 4th Ave., Vancouver, B.C.  
V5Y1G3

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

Jastram Engineering, 485 Mountain Hwy N, North  
Vancouver, B.C. CANADA V7J 2L3

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Hamburg GERMANY

IHC Lagersmit, P.O.B. 5 - 2960 AA Kinderdijk - HOLLAND  
Railko Ltd., Loudwater, High Wycombe, Bucks Hamshire  
ENGLAND HP1090V

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

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Hamburg 1, GERMANY;

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NY 11363-0168

Duramax Marine, 16025 Johnson St., P.O. Box 67, Middlefield, OH  
44062-0067

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60089

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ERL Marine Products div, PO Box 1026, New Albany, IN  
47151-1026

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FL 32561

MMC International, 60 Inip Dr, Inwood NY 11096  
Prime Mover Controls, 3600 Gilmore Way, Burnaby V5G 4R8  
CANADA

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Goteborg SWEDEN

Technical Marine Service, 6040 North Cutter Circle, Portland,  
OR 97217

Electronic Marine Systems, 800 Femdale Pl., Rahway, N.J. 07065  
Auxitrol, 168 Bureaux de la Colline, 92213 Saint-Cloud Cedex,  
France

King Engineering Corp., P.O. Box 1228, Ann Arbor, MI 48106  
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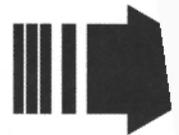
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30	Circle Seal Controls, Inc.	seals	220	29	PCS Marine Technologies	consultants	274
30	Comnav Marine Ltd.	autopilot	221	47	Plastic Pilings, Inc.	dock fendering systems	275
16	Corroseal, Inc.	coatings/ corrosion control	311	9	Powerhouse Diesel	diesel engine parts	276
11	Crowley Marine Services	shipyard	222	72	Predict/DLI	vibration screening tool	316
75	Cummins Marine	diesel engines	332	32	Propulsion Systems, Inc.	propulsion	313
63	Custom Ship Interiors	ship interiors	223	76	Prosar Technologies	marine supplies & equipment	335
65	Delta T Systems	ventilation equipment	327	54	Proteus Engineering	computer software	277
20	Dutchess Bakers Machine	food service	224	10	Puget Sound Rope	ropes	278
c3	Eastern Shipbuilding	shipyard	225	60	Quality Refrigeration	refrigeration & a/c	279
15	Edgewater Machine	deck equipment	226	73	Reverse Osmosis of South Florida	desalination	280
59	Effer S.P.A.	cranes	227	27	Richard's Galley Supply	galley equipment & supplies	281
63	Electronic Marine Systems	technology	228	73	RITI	marine supplies & equipment	318
65	Electronic Marine Systems	technology	229	12	RW Fernstrum	cooling systems	282
67	Electronic Marine Systems	technology	230	42	S.P. Radio A/S	communications	283
69	Electronic Marine Systems	technology	231	43	S.P. Radio A/S	communications	283
61	Envirovac	sanitation device	232	64	Scale Reproductions, Inc.	scale reproductions	285
65	Exceltec	sanitation	233	73	Schnitzer Steel Industries	marine supplies & equipment	323
38	FCS, Inc.	tank gauging system	234	46	Schoellhorn-Albrecht Machine Co.	deck machinery	286
71	Fincantieri Naval Shipbuilding	high speed ferries	235	26	Sea Transport Corp.	marine architect & engineers	287
8	Fuel Dynamics, LLC	fuel decontamination	236	66	Sea Transport Corp.	marine architect & engineers	309
59	G.J. Wortelboer Jr. B.V.	anchors, chains	237	30	Service Valve & Fitting	valves & fittings	288
56	Gaylord Industries	galley exhaust hoods	331	67	Silex, Inc.	silencers/expansion joints	289
56	General Thermodynamics	cylinder load analyzer	329	66	Skookum	deck machinery	290
62	Gibbs & Cox	naval architects	238	58	Smith-Berger Marine	deck hardware	291
22	Gislaved Folie AB	interiors	239	62	SNAME	conference	322
69	Giumma SRL	wet units	240	36	Soundcoat	noise control	320
58	Governor Control Systems	diesel engine parts	241	44,45	Stewart Stevenson	diesel engines	294
33	Haley Marine Gears	gears	242	9	Stratos Mobile Networks	mobile communications	295
15	Harbor Industries, Inc.	gaskets/cleats	243	68	Superior Energies Inc.	manufacturing & contracting	296
73	Harrington Marine	kort nozzles	244	39	Syncrolift	drydocking system	297
60	Hotel Monteleone	hotel	245	54	Thermax	bulkhead panel	298
64	Houston Marine	marine supplies & equipment	246	15	Turbo Diesel, Inc.	propulsion	328
25	ICG Satellite Services	satellite communications	247	38	Ulstein Bergen AS	propulsion	324
57	In-Place Machining	crankshaft repair	248	22	Union Naval Valencia, S.A.	ship builder	299
57	Int'l Merchant Marine Registry of Belize	Merchant Marine Registry	249	13	Urethane Products Corp.	foam filled fenders & buoys	300
50	Intercontinental Engineering & Mfg.	deck machinery	250	10	Vancouver Shipyards	shipyard	301
72	International Maritime Exposition	Int'l Maritime Exposition	292	26	W&O Supply	valves	302
59	ITW Philadelphia Resins	chocking	251	37	Wartsila NSD Corp.	propulsion	303
15	Jeamar Winches	winches	252	57	Water Weights	lifting equipment testing	304
27	Jesse Engineering	flanges	254	60	Waterman Supply	marine equip.	306
60	Jon M. Liss Assoc., Inc.	marine supplies & equipment	330	73	Western Machine Works	shipbuilders	307
23	Jotun Valspar	marine coatings	334	54	Yachting Consult B.V.	CAD/CAM	319
64	JW Fishers	underwater cameras	255				

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

570	660	410,12,14,16,18V	1400	430	23.3	9.4	14000-25200
570	750	4 5,6,7,8,9,10L	1325	375	22.2	9.4	6625-13250

### Industrial & Marine Engines

187 Sweden  
5538-1000  
5538-2993

Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
127	145	4	6L	38.7-40.5	1800-2100	X	8.76-10.22	232-243
115	144	4	6L	25.8-27.3	1900-2200	X	9.12-10.56	155-164
115	144	4	6L	39.0-40.5	1900-2200	X	9.12-10.56	234-243
115	144	4	6L	49.55.2	2200-2300	X	10.5611.04	294-331
115	144	4	6L	31.45-33.5	1900-2200	X	9.12-10.56	189-201
127	145	4	6L	45.7-48.0	1800-2100	X	8.76-10.22	274-288
127	145	4	6L	61.3-73.7	2100-2200	X	10.22-10.71	368-442
127	140	4	8V	42.4-53.0	1800-2100	X	8.4-9.8	339-424
127	140	4	8V	60	2100	X	9.8	480
127	140	4	8V	62	2100	X	9.8	496
127	140	4	8V	68.9	2200	X	10.27	551

### n Bergen AS

Bergen N-5808 Norway  
55-53-6000, Fax: 011-47-55-53-6104  
ulste@ulstein.no, Website: www.ulstein.no

Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
320	360	46,8,9L,12,16,18 V	4	424-442	720-750	24.4	8.6-9	2545-7945
320	360	46,8,9 L,12,16,18 V	4	442	750	24.4	9	2650-7945
250	300	43,5,6,8,9,12,16,18 V	4	195-221	720-900	20-22	7.2-9	585-3975
250	300	46,8,9,1,12,16,18 V	4	202-223	750-825	22	7.5-8.25	1215-4010

### Penta

S-40508 Sweden  
j-31-235460  
16-31-510348

Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
			4		3800			96
			4		3250			81
			4		3900			110
			4		3800			95
			4		3900			110
			6		2500			107
			6		3250			125
			6		3800			147
			6		3600			121
			6		3800			147
			6		3800			170
			6		3900			170
			6		3900			170
			6		3900			170
			6	2500-2800				173-234
			6	2800				272
			6	2000-2600				160-280
			6	2600				316
			6	2600				331
			6	2500-2600				316-331
			6	1800-2000				175-200
			6	1800-2000				235-265
			6	2200-2250				315-335
			6	1800				221-235
			6	1800-1900				280-294
			6	2100-2250				390-441
			6	2100-2250				390-449
			6	1800				375
			6	1800-2250				404-441
			6	2100				500-566

### Wartsila NSD Corp.

Trade Center  
Wienbachstrasse 95  
50 Zurich, Switzerland  
11 1 305 7100  
41 1 305 7193

Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
170	200	4 6,8L,12,16,18V	4	115-130	1500-1800	19.1-20.2	10-12	690-2340
200	240	4 12,16,18V	4	175-200	1200-1500	21.2-23.2	9.6-12	2100-3600
250	300	4 6L,12,16V	4	184-258	720-1000	18.7-20.8	7.2-10	1110-3680
200	280	4 4,5,6,8,9L	4	130-165	720-750	22.5-24.6	6.7-9.3	520-1485
250	300	4 6L,12,16V	4	184-230	720-1000	18.7-20.8	7.2-10	1110-3680
260	320	46,8,9L,12,16,18V	4	295-325	900-1000	23-24.6	9.6-10.7	1770-5850
260	320	4 12,16,18V	4	400	1000	28.3	10.7	4800-7200
320	350	44,6,8,9,12,16,18V	4	370-410	720-750	21.3-24	8.4-8.75	1480-7380
320	400	46,8,9,12,16,18V	4	450-460	720-750	22.9-23.3	9.6-10	2700-8280
380	475	46,8,9,12,16,18V	4	660	600	24.5	9.5	3960-11880
460	580	46,8,9,12,16,18V	4	905-1050	450-514	21.9-26.1	8.7-9.9	5430-18900
460	580	46,8,9,12,16,18V	4	905-1050	450-514	21.9-26.1	8.7-9.9	5430-18900
320	350	44,6,8,9,12,16,18V	4	370-410	720-750	21.3-24	8.4-8.75	1480-7380
640	900	4 5,6,7,8,9L	4	2010	327-333	25-25.5	9.82-10	10050-18090
640	770	4 12,16,20V	4	1940	400-428	22-23.5	10.3-11	23280-38800
400	560	4 6,8,9L,12,14,16,18V	4	750	510	25.1	9.5	4500-13500
500	660	4 6,8,9L	4	1080-1200	450	24.7	9.9	6480-10800
380	1100	2 4,5,6,7,8,9L	2	370-680	141-196	16.7	7.19	1480-6120
480	1400	2 4,5,6,7,8,9L	2	600-1090	111-154	16.8	7.19	2400-9810
480	2000	2 5,6,7,8L	2	1020-1455	102-127	19	8.5	5100-11640
520	1800	2 5,6,7,8L	2	1120-1600	110-137	18.3	8.2	5600-12800
580	2416	2 5,6,7,8L	2	1490-2125	84-105	19	8.5	7450-17000
600	2,250	2 5,6,7,8L	2		91-114	19.5	8.55	8,250-18,880
620	2150	2 5,6,7,8L	2	1600-2285	92-115	18.4	8.2	8000-18280
680	2720	2 5,6,7,8L	2	2060-2940	75-94	19	8.5	10300-23520
720	2500	2 5,6,7,8L	2	2155-3080	79-99	18.3	8.3	10775-24640
840	2900	24,5,6,7,8,10,12L	24	2050-3730	58-81	17.2	7.83	8200-44760
840	3150	2 5,6,7,8,9L	2	2720-3800	59-74	18	7.8	13000-34920
840	3150	2 5,6,7,8,9L	2	2870-4100	61-76	18.5	8	14340-34900
840	2400	2 4-12L	2	2800-4050	82-102	17.9	8.2	11360-48600
960	2500	2 6-12L	2	3840-5490	90-100	18.2	8.3	23040-65880

### Volvo Penta of the Americas

1300 Volvo Penta Dr, Chesapeake, Va. 23320  
Tel: 757-436-2800; Fax: 757-436-5150

Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
			4		3800			96
			4		3250			81
			4		3900			110
			4		3800			95
			4		3900			110
			6		2500			107
			6		3250			125
			6		3800			147
			6		3600			121
			6		3800			147
			6		3800			170
			6		3900			170
			6		3900			170
			6	2500-2800				173-234
			6	2800				272
			6	2000-2600				160-280
			6	2600				316
			6	2600				331
			6	2500-2600				316-331
			6	1800-2000				175-200
			6	1800-2000				235-265
			6	2200-2250				315-335
			6	1800				221-235
			6	1800-1900				280-294
			6	2100-2250				390-441
			6	2100-2250				390-449
			6	1800				375
			6	1800-2250				404-441
			6	2100				500-566

### Wartsila NSD North America Inc

201 Defense Highway, Suite 100  
Annapolis, Md. 21401  
Tel: 410-573-2100 Fax: 410-573-2200

Bore (mm)	Stroke (mm)	Cycle	Cyl# IL/V	kw/cyl	RPM	BMEP	Mean Piston Speed	Output Range
170	200	4 6,8L,12,16,18V	4	115-130	1500-1800	19.1-20.2	10-12	690-2340
200	240	4 12,16,18V	4	175-200	1200-1500	21.2-23.2	9.6-12	2100-3600
250	300	4 6L,12,16V	4	184-258	720-1000	18.7-20.8	7.2-10	1110-3680
200	280	4 4,5,6,8,9L	4	130-165	720-750	22.5-24.6	6.7-9.3	520-1485
250	300	4 6L,12,16V	4	184-230	720-1000	18.7-20.8	7.2-10	1110-3680
260	320	46,8,9L,12,16,18V	4	295-325	900-1000	23-24.6	9.6-10.7	1770-5850
260	320	4 12,16,18V	4	400	1000	28.3	10.7	4800-7200
320	350	44,6,8,9,12,16,18V	4	370-410	720-750	21.3-24	8.4-8.75	1480-7380
320	400	46,8,9,12,16,18V	4	450-460	720-750	22.9-23.3	9.6-10	2700-8280
380	475	46,8,9,12,16,18V	4	660	600	24.5	9.5	3960-11880
460	580	46,8,9,12,16,18V	4	905-1050	450-514	21.9-26.1	8.7-9.9	5430-18900
460	580	46,8,9,12,16,18V	4	905-1050	450-514	21.9-26.1	8.7-9.9	5430-18900
320	350	44,6,8,9,12,16,18V	4	370-410	720-750	21.3-24	8.4-8.75	1480-7380
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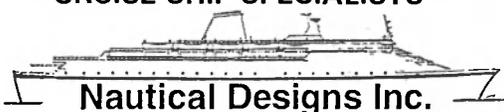
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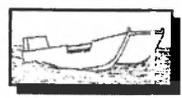
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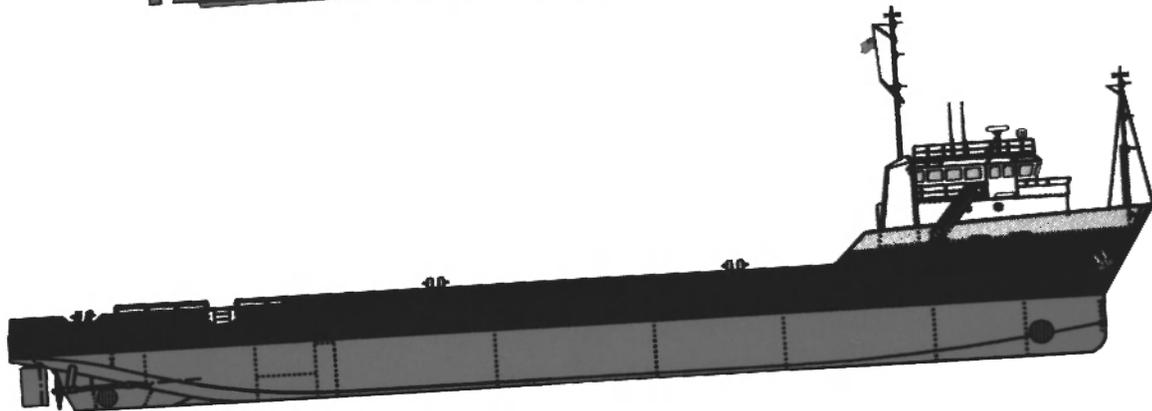
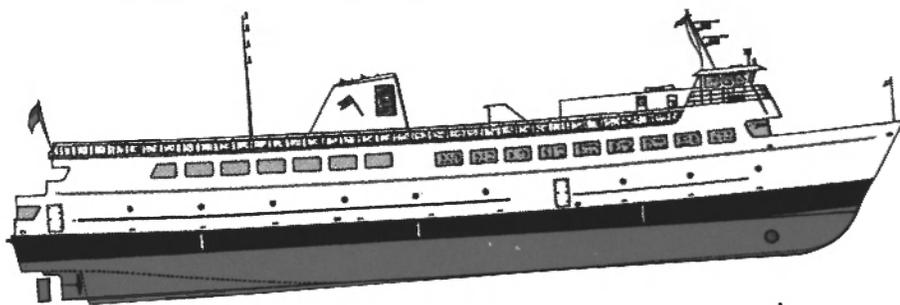
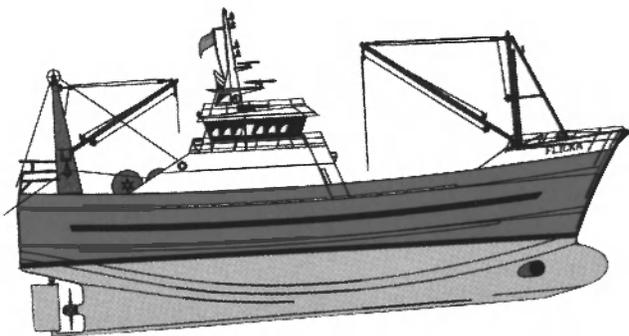
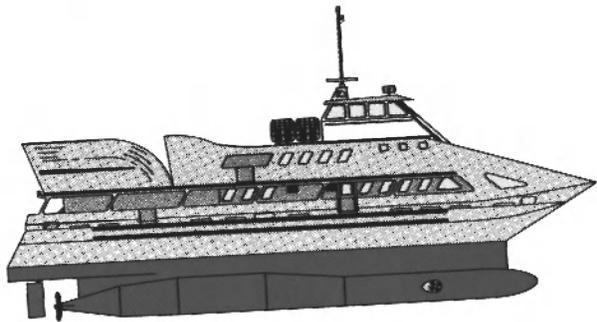
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