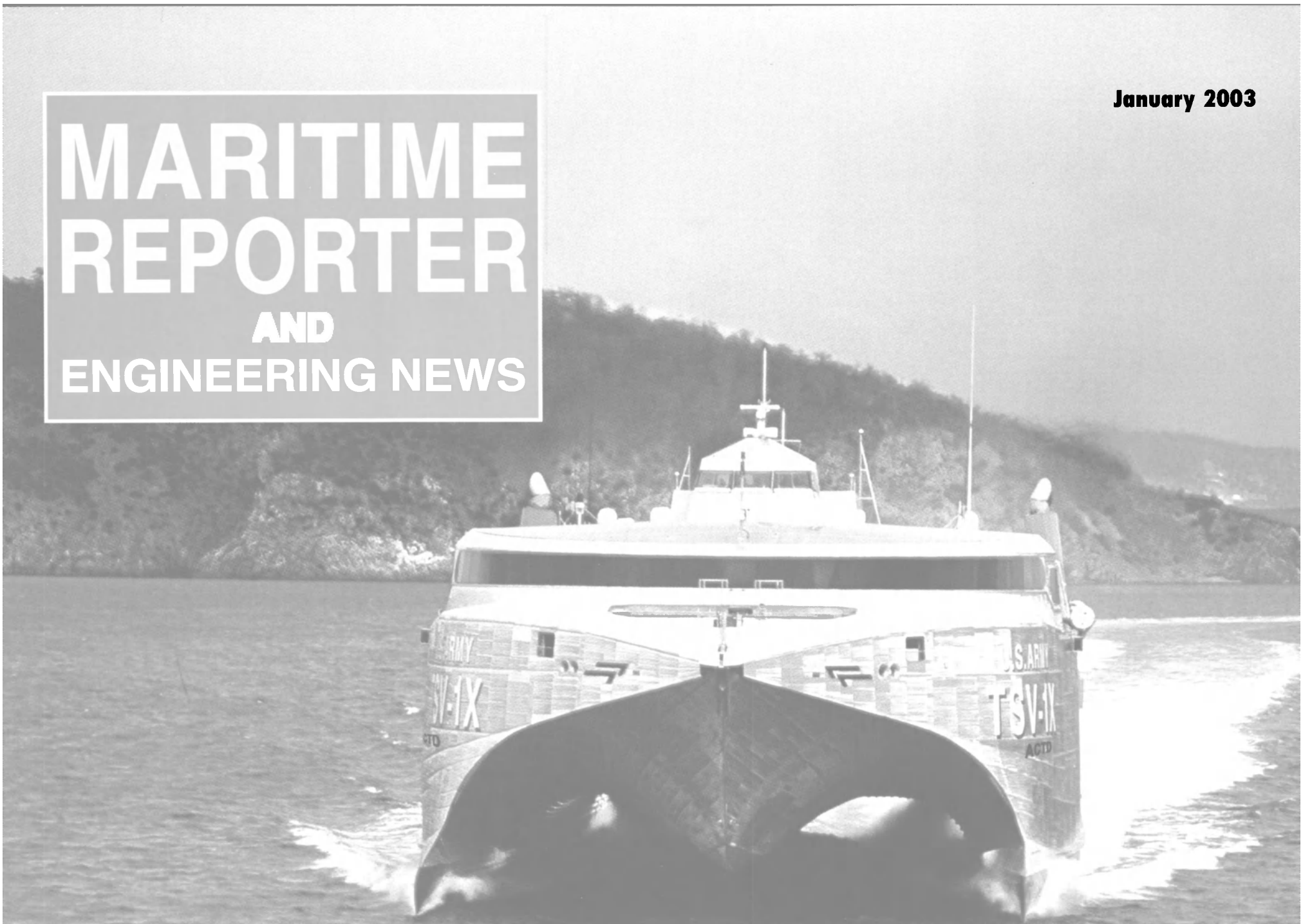
January 2003

MARITIME REPORTER
AND
ENGINEERING NEWS



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Many new ships to come

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How it affects your business

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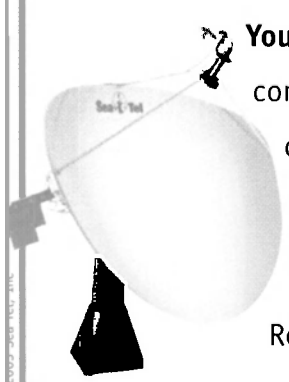

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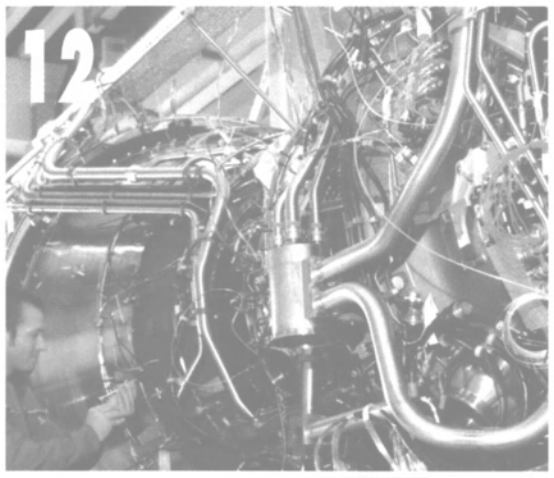

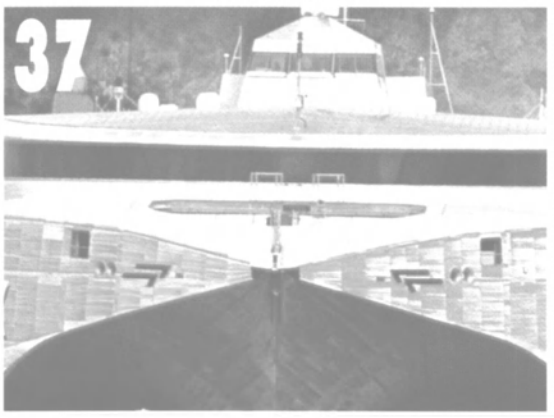

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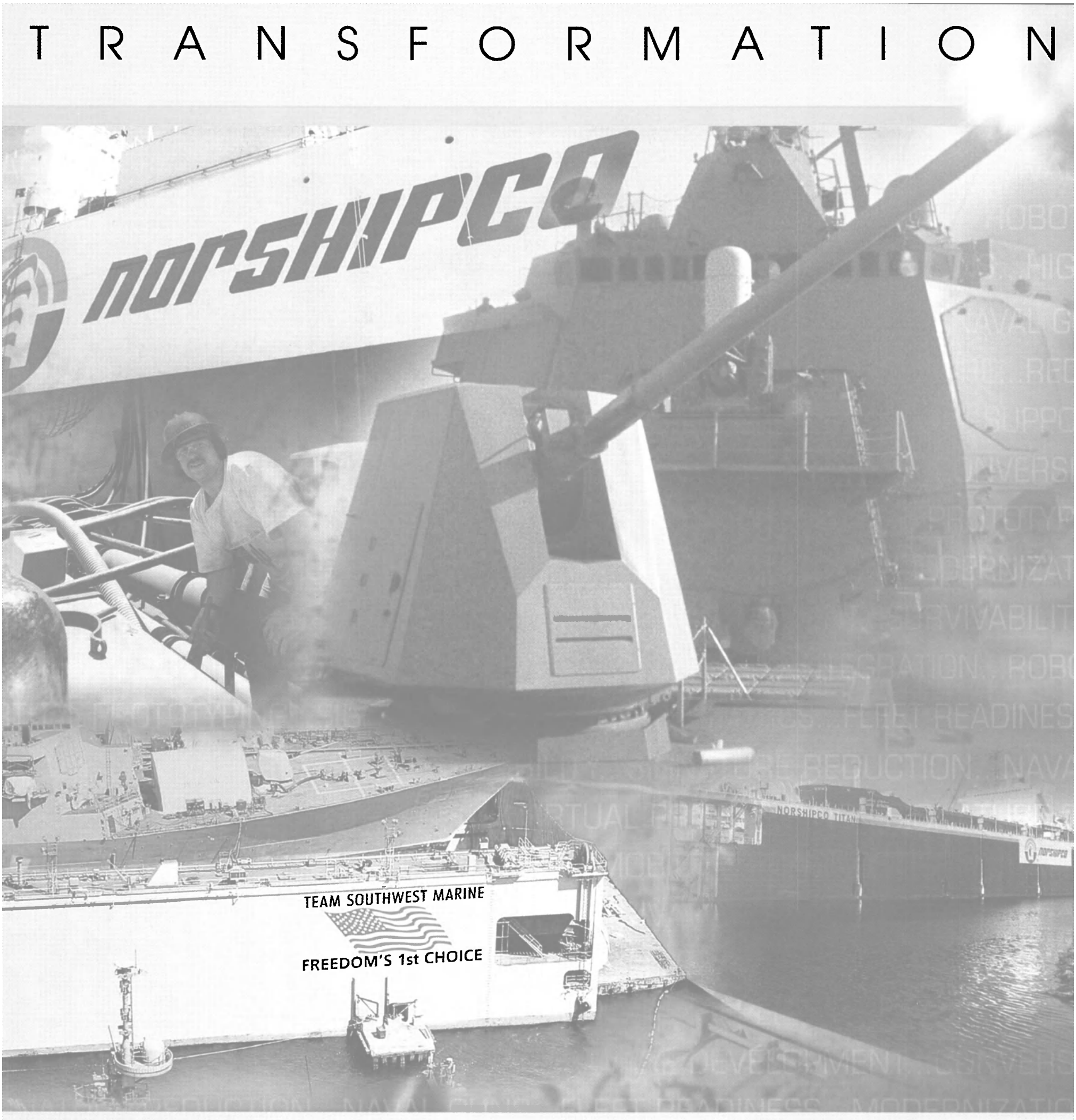
TRANSFORMATION



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UNITED STATES MARINE REPAIR

United Defense

Editor's Note

The year 2002 will undoubtedly be remembered as one of the most tumultuous, yet influential, in maritime history. A number of significant measures and events that have, and will, continue to deeply impact and define the marine market for decades to come were simultaneously started, continued or concluded during the calendar year, as real decisions affecting every level of the business were made. The significance of the year cannot be lost in the whirlwind of activity ... and what a storm it was. While at times it may have seemed impossible to grasp a seemingly endless array of new proposals, mandates and rules, the eye of this storm is, and will continue to be, Safety and Security.

Pre-September 11, 2001, Maritime Security was a nice topic, an important subject that commanded significant attention. Today, the matter of keeping ships, crew, cargo, ports and populations safe permeates every fiber of a boat and ship owners' plan. Priorities, focus and funds are constantly changing and multiplying, as companies seek to ensure that their operations are not only safe, but compliant with new and emerging rules and regulations.

At press time, the International Maritime Organization wrapped up a week of intensive meetings at which a number of decisions were made regarding new safety initiatives, some with implementation dates as early as July 2004. The decisions are the culmination of a year of work by the IMO's Maritime Safety Committee and its Working Group, and the most far-reaching measure is the International Ship and Port Facility Security Code which ensures the security of ships and port facilities is basically a risk management activity and that to determine what security measures are appropriate, an assessment of the risks must be made in each particular case.

At home, much has been happening in the area of Transportation Security, as Dennis Bryant discusses in his Government Update, starting on page 20. The changes in the U.S. government are profound, and looked upon as the most significant in more than 60 years. The Department of Homeland Security will officially open its doors on March 1, 2003. The Coast Guard will remain an integral part of the new department, and the aforementioned Maritime Transportation Safety Act of 2002 is the law.

Currently, there are as many questions as answers stimulated by the query "How does all of this affect my business?"

Stay tuned, as *Maritime Reporter* will dedicate significant space in each edition, headlined by Mr. Bryant's Government Updates section, to help keep you ahead of the curve.

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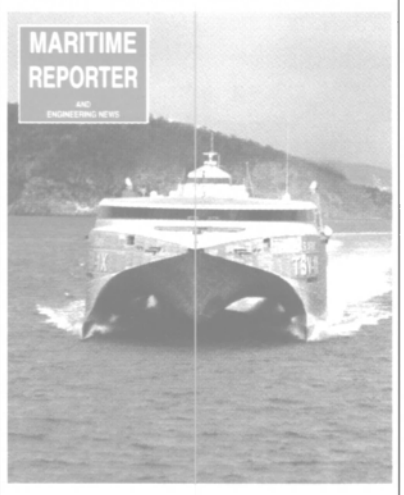
On the Cover



This month's cover features Incat Spearhead, port of the Advanced Concept Technology Demonstrator program by the Office of the Secretary of Defense and U.S. Army. The vessel will be used to demonstrate and evaluate its ability to perform during certain mission scenarios. See related story starting on page 38.

In this edition

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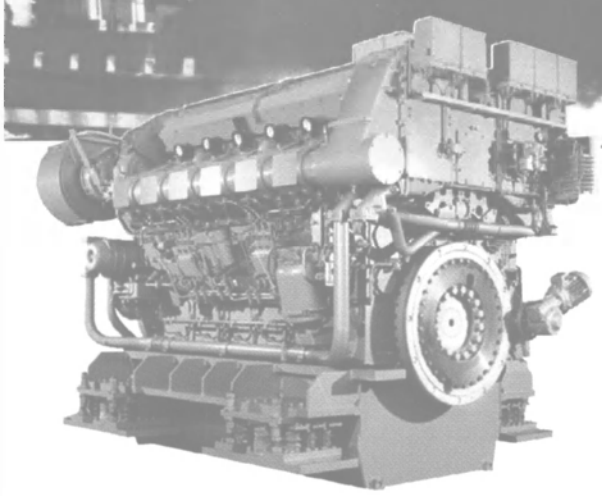
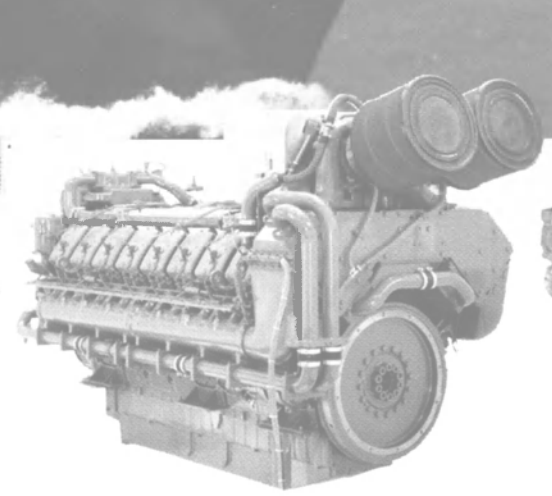


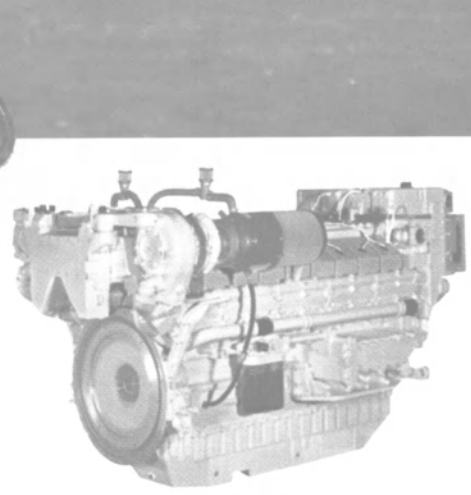
628

1333 - 4825 BHP
Speed 750 - 1000 min^{-1}
Water-cooled L6, L8, L9, V12 and V16



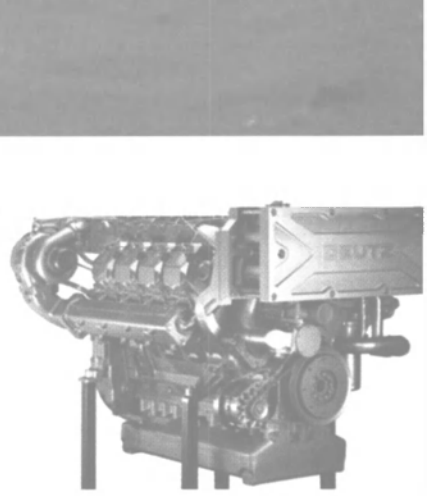
620

1197 - 3046 BHP
Speed 1500 - 1860 min^{-1}
Water-cooled V8, 12 and V16



616

418 - 1776 BHP
Speed 1500 - 2300 min^{-1}
Water-cooled V8, V12 and V16



1015

272 - 590 BHP
Speed 1500 - 2100 min^{-1}
Water-cooled V6 and V8

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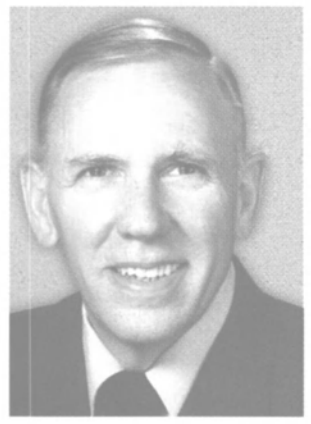
New & Notable

Alaska Awards Metlakatla Ferry Contract to Conrad

Conrad Industries emerged as the winner to build a new ferry for the high profile customers Alaska Marine Highway. AMH sees the signing as the ushering in of a new era in marine transportation for the community of Metlakatla with the signing of the contract. The new vessel will provide dedicated service between Metlakatla and Ketchikan, two of the Inside Passage's southernmost communities. Southeast Region Director, **Bob Doll**, represented the Alaska Department of Transportation & Public Facilities at the signing ceremony. "This ferry means better service to the communities of Metlakatla and Ketchikan and less cost to the State of Alaska." The detailed design for the Metlakatla ferry was performed by **Pat Eberhardt,** P.E. of Coastwise Engineering, Juneau under contract to the State of Alaska. Modeled after a North Sea supply vessel, it is designed to operate the 16 nm run between Ketchikan and Metlakatla in sea state 6 conditions, 13 to 20 ft. waves and winds in excess of 30 knots. Its rugged, open deck design will allow operation more than 95 percent of the time, with a normal operating speed of between 12 and 14 knots. At 181 ft. (55.1 m) the new Metlakatla ferry will be able to transport 149 passengers and 18 vehicles.

King Named CEO for VT Halter Marine

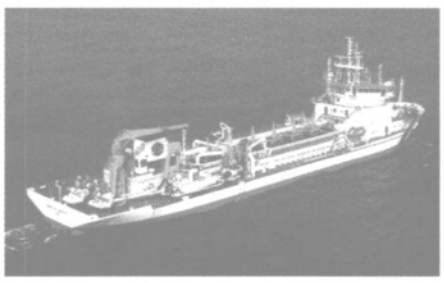


Boyd E. (Butch) King was appointed CEO of VT Halter Marine Inc. at the beginning of the month.

King most recently served as a senior associate with Booz Allen and Hamilton, consulting on various logistical support projects. Among others, this included the study and recommendation to revamp the Balkan Military Support initiative for the United States Army Europe. King also played an instrumental role in developing the Capstone Training Course for the first Interim Brigade Combat Team command and staff for the Army's Training and Doctrine Command.

King had a successful 35-year career in the U.S. Army, culminating in his appointment as Director of Transportation, Energy and Troop Support on the Army staff. In this position, he was responsible for a $3.9-billion dollar program to improve power projection platforms in the United States. During his Army career, King was at the helm of various logistic operations, which included the shipping of combat equipment in support of operations in Haiti to meet National Command Authority requirements for deployment. He retired in 1998 as a Brigadier General.

Gijon Delivers Second Large Dredger



IZAR Gijon Shipyard recently delivered an 8,500 cu. m. TSHD (Trailing Suction Hopper Dredger), the second dredging vessel built by Gijon for Dragages Ports, an agency of the French Public Works ministry.

Samuel de Champlain, a self-propelled TSHD vessel (Yard no. 366), was ordered by Dragages Ports from Gijon Shipyard on May 24, 2000, together with a smaller 5,000 cu. m. capacity unit, a vessel dubbed Daniel Laval.

Samuel de Champlain is already operating in river Loire, in France, according to shipowner sources. It is equipped with a trailing side suction pipe with underwater dredge pump on starboard and bottom valves for load dumping.

Dredging Particulars

Length, o.a.	384 ft. (117 m)
Length, bp	361 ft. (110 m)
Breadth, molded	79 ft. (24 m)
Depth to main deck	33 ft. (10 m)
Max. draft on dredging freeboard	26 ft. (8 m)
DWT on dredging freeboard	12,150 tons
Capacity	8,500 cu. m.
Speed	13 knots
Dredging depth	26m

Classification BV (for the Notation I 3/3 E + Hopper Dredger Deep Sea, AUT.PORT, ALP)

Hope Services Readies Another Push Boat

Hope Services of Dulac, La., is putting the finishing touches on the 20th in the series of their popular 72 x 30-ft. (21.9 x 9.1-m) pushboats. The last two were built for Higman Towing of Houston, Texas and were delivered in May and August of 2002.. Each boat in the series is powered by a pair of 12-cylinder Cummins KTA38 M0 engines rated for 850 hp at 1800 rpm. The engines turn into Twin Disc 540 gears with 6.14:1 reduction. The 73 x 56-in. four-blade stainless propellers are mounted on six-in. stainless shafts. Electrical needs are met by a pair of Cummins 6B series powered 50 Kw gen sets. Steering and flanking rudders are controlled through a system provided by Custom Hydraulics.

Coquitlam Upgraded

The 26-year-old Queen of Coquitlam left for Vancouver Drydock to begin a major upgrade by the Washington Marine Group of Vancouver. The vessel is one of five double-ended vessels that operate on major routes between Vancouver Island and the Mainland. It will undergo extraordinary maintenance, regulatory compliance modifications and renovation of the restaurant and passenger accommodation to prepare it for an additional 20 years of service. Shipyard work is scheduled to May 2003, followed by four weeks of crew training certification.

Halmatic Pilot Boats for Spain's Atlantic Coast

Two of VT Halmatic's new Optimized 35 Pilot Boats entered service with the pilots of La Coruna and Algeciras. Based at opposite ends of Spain's Atlantic Coast these 35's join a list of VT Halmatic pilot boats operating on the Iberian Peninsula and Canary Islands. The Optimized 35 features a new resiliently mounted wheelhouse offering increased comfort and visibility for the two man crew and up to four pilots. The isolated wheelhouse helps to reduce levels of noise and vibration from the machinery space. Equipment levels have been significantly improved from that found on the previous model. The boats are powered by twin Perkins Sabre M215C or Caterpillar 3056TA diesel engines to give a 20-knot top speed on a 9.5 ton displacement.

Within the last few months a Halmatic 40 and Halmatic 35 have also entered service with the pilots of Las Palmas de Gran Canaria and Pasajes. These boats were fitted out respectively by Comercial Rofer in the Canary Islands and Chantiers Sibiril in France.

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Principal Particulars

Length, (o.a.)	35 ft. (10.6 m)
Length, (waterline)	31 ft. (9.4 m)
Beam	11 ft. (3.5 m)
Draft	4 ft. (1.1m)
Displacement	9.5 tons
Fuel Capacity	1,200 liters
Engines	Twin Perkins Sabre M215C
Rated	215hp @ 2,500 rpm
OR	
Engines	Twin Caterpillar 3056TA
Rated	205hp @ 2500 rpm
Range	250 nm
Gearboxes	Twin Disc MG 5050A
Speed	20 knots
Navigation	Raymarine through Ambex Ltd
VHF	2 off Sailor RT 2048
Wipers	Wynn Type C

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Bollinger Delivers Ms. Sara Jane

Bollinger recently delivered the Ms. Sara Jane, the first of two innovative 220 "Super Shelf" series of OSVs to C&G Boats.

Bollinger Shipyards, Inc. last month delivered the latest in a line of innovative vessels — and the first of Bollinger's new 220 'super shelf' series. Ms. Sara Jane is the first of two new 207 x 53 x 19-ft. (63 x 16.1 x 5.7 m) supply boats to MNM Boats, a subsidiary of C&G Boats, Golden Meadow, La. The boat is impressive foremost because it has a cargo capacity exceeding that of a 220-ft. (67-m) vessel.

The boat was designed via a joint effort of Bollinger, MNM and other Bollinger customers, to produce a high cargo capacity offshore support vessel (OSV) that can operate on and off the U.S. Continental Shelf without many of the construction expenses and operational considerations of OSVs that work in deeper water at greater distances.

"It can carry as much or more as some 230-ft. OSVs," said **Scott Theriot,** executive vice president new construction of Bollinger, "and because of her design, she can work on and off the shelf and can access oil and gas well installations in shallow water as well as deep water locations. The 220 series is a natural follow-on to our 145 (44.1) and 166-ft. (50.5-m) classes of supply boats that have capacities of much larger OSVs, proving that less can be more."

"Ms. Sara Jane's liquid mud tanks can carry over 6,000 barrels of drilling mud and her dry bulk tanks are able to carry over 6,000 cu. ft. of material. It has three separate pump systems that can handle three different liquid mud products without danger of contamination. All pump systems valves can be operated through a central control system in the pilot house that also controls the boat's ABS class DP1 dynamic positioning system."

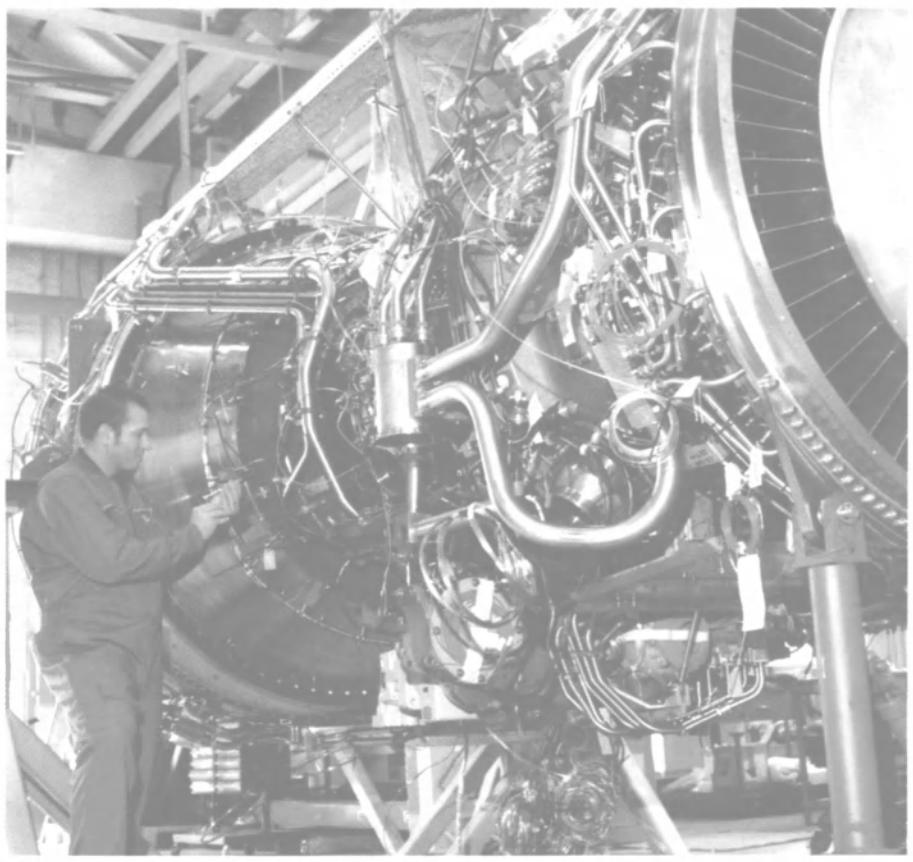
Power is provided by twin Caterpillar 3516D diesel engines developing 2,000 hp through Reintjes reduction gears with a ratio of 6.44:1, a package that delivers a sustained 11-knot speed. They drive Bollinger 102-in. propellers and independent rudders. Electrical power is produced by two Caterpillar 3408 diesels generating 370 kW each. Brunvoll 700 hp and 400 hp bowthruster and stern thrusters, respectively, ease maneuverability. Bowthruster noise is reduced by a Sound Down noise damping system. "The Ms Sara Jane has already exceeded our expectations on her first job by surpassing the specified cargo carrying capabilities. Bollinger has designed a vessel that provides operator cost effective equipment that has already exceeded the demands of our offshore clients," said **Joey Arceneaux,** president of C&G Boats, Inc, said.

Bollinger has contracts for seven more of its new 220 series in addition to the two for MNM Boats.

Investment in Design • By David Tinsley

Rolls-Royce Gas Turbines

Air-to-Sea Technology Transfer



by David Tinsley, technical editor

As a response to the marine market's demand for higher power concentrations and increased plant reliability, deliverable at competitive cost, the new offering from Rolls-Royce is stimulating fresh interest within a conservative shipping industry in gas turbine-based solutions.

Building on the company's huge investments in aero engine technology over the past decade, the MT30 gas turbine has been specifically prepared for shipboard applications, combining power density and operating attributes in a manner intended to widen the appeal of gas turbine power among the maritime community. With 36-MW obtainable from a compact unit of barely 9-m (30-ft) in length, a claimed consumption rate of 0.207-kg/kWh at maximum output, and 80-percent parts commonality with a proven aero engine of outstanding reliability, the MT30 holds promise as a challenger to diesel plant options as well as to existing gas turbines.

The MT30 has been engineered to meet the needs of naval ships and sophisticated commercial vessels alike. While suited to surface combatants in the shape of frigates, destroyers and aircraft carriers, and fast naval auxiliaries and logistics vessels, the main target applications in the civil domain are cruise ships, full-displacement fast RoPax vessels, high-speed monohull ferries and also large LNG carriers. Rolls-Royce is thereby intent on break-

ing new ground, by selling its home-grown, aeroderivative machinery into the commercial marine power sector.

The engine's aero parent, the Trent 800, has surpassed two-million running hours since its 1996 service debut. It accounts for nine out of every 10 engines selected for Boeing 777 aircraft, and was the first engine to be certified for ETOPS (Extended range over-water operations by twin-engine aircraft) at entry into service.

The popularity of the Trent 800, and the fact that so much of its componentry is perpetuated in the MT30, has a signal bearing on unit production costs, and therefore on the price at which the marine engine will be cast in the intensely competitive marine market. The factor of engineering commonality also gives relevance, from a potential marine user's standpoint, to the "99.9-percent dispatch reliability" attributed by Rolls-Royce to the Trent 800 civil aero engine.

The company's commitment to strengthening its position in the marine power domain has been underscored by its creation of a £9-million ($14-million) dedicated test facility for the MT30 at its Bristol site in the UK, where the prototype is now being put through its paces.

A second development engine will be used for endurance tests and the obtaining of Det Norske Veritas type approval, anticipated for August 2003, in keeping with the scheduled commercial release of the first production engines during early 2004.

A steady stream of interested parties from the naval and commercial marine sectors worldwide, including the USA, is being received at Bristol, and the MT30 has already been written into the draft specification for the fast, monohull trailership design proposed by Spanish shipbuilding, ship repair and engineering group IZAR, in conjunction with Rolls-Royce.

The Anglo-Spanish initiative, dubbed the European High-Speed Cargo Vessel (EHSCV), is also expected to lead to a companion RoPax proposal, and was discussed in this column in November's issue. The MT30 has been conceived for both mechanical and electrical drive configurations, and its efficiency is said to be retained at powers down to 25-MW, making for increased application flexibility. Gas turbine plant has certain strengths in terms of trends in target commercial markets, as GE Marine Engines has already well demonstrated by its references for LM-series aeroderivative gas turbines in high-speed ferries and cruise liners.

Lower pollutant exhaust emission levels than those of diesel engines will undoubtedly be valued more and more against a backcloth of proliferating environmental controls and regulations, while a low mechanical noise signature and readily attenuated structural noise transmission hold increasing value in the context of passenger and crew comfort. The MT30's thermal efficiency factor of 40-percent or more directly influences specific fuel consumption, and additionally means less emissions per ton of fuel burnt.

The annular combustors of the new marine engine are similar to those of the aero parent, and have been designed to burn commercially available distillate fuel to DMA standard. Consumption is said to be comparable with high-speed diesels at maximum power, and the fuel burn is also designed to match compet-

ing gas turbines at 25-MW.

With a total module weight, including the acoustic enclosure, of as little as 22-tons, the power-to-weight ratio is impressive, to say the least. For genset drive applications in cruise ships using electric propulsion motors, the gas turbine permits more flexibility in the ship design process. Engines can be sited in the funnel, or aft near podded propulsors, for example, so as to make the most effective use of the hull envelope. Modular construction facilitates shipyard handling in newbuild projects. It expedites major maintenance, such that modules can be removed and replaced in many instances, avoiding the cost of complete engine overhaul.

Although gas turbine plant for cruiseships and fast, powerful ferries is an established option, Rolls-Royce has broken new ground by also advocating the emergent MT30 for LNG carrier propulsion. The proposal is timely, given the current level of industry interest in possible alternatives to steam turbine plant for large LNG tankers, most recently expressed in the milestone selection of diesel-electric propulsion for a French newbuild. Rolls-Royce says that adoption of an MT30, rated at some 30-MW to ensure a laden speed of 20-knots, would enable engine room length in a 140,000-cu. m. capacity LNG carrier to be reduced by 19-m relative to a comparable steam turbine application. This could release up to 12-percent more of the given hull space for cargo, or alternatively enable a reduction in overall ship size. As with steam turbine plant, the MT30 could utilize natural gas cargo boil-off. Maintenance contracts covering servicing, overhauls and spare parts supply, a field in which Rolls-Royce continues to show its mettle in the airline industry, are to be offered to support shipping operators and foster competitive through-life costs. The MT30 may be regarded as the first of a new generation of marine gas turbines. For instance, the development would serve as the basis for a 50-MW unit, another aero Trent derivative, proposed for the long-mooted transatlantic FastShip freight carrier project. The timing and extent of follow-on models to the MT30 will no doubt be heavily influenced by market reception to the potent new design encapsulated in the machine now running on the testbed at Bristol.

Damen Vessels Feature MAN B&W Power

Two MAN B&W main engines type 6L28/32A have been ordered by Damen Shipyards Gorinchem, Holland, for installation into a tug for the Republic of Sudan.

The newbuilding is based on one of Damen's standard designs (Damen Stan Tug 4511) and is intended to for tug and escort operations in the Red Sea. The propulsion package consists of two engines driving FP propellers via rev/red gearboxes. Each engine has a 280 mm bore, a 320 mm stroke and is rated 1,425 kW at 775 rpm.

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Southbury LES:"Outages are Not Acceptable"

By Greg Trauthwein

If you are concerned about the effects of Satellite Communication service provider consolidation, you will like the Telenor/Comsat hook-up.

If you care nothing about corporate takeovers, rather are focused on ensuring the availability of a strong satellite communication signal, always, you will like the Telenor/Comsat hook-up.

In short, if you use satellite communications services, you will probably like and benefit from the Telenor/Comsat hook-up.

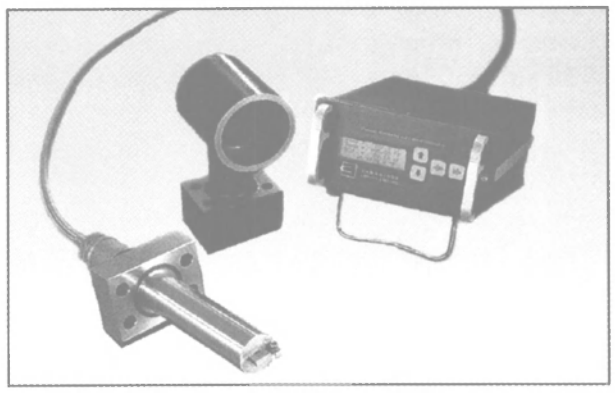
Hardly "news," the integration of Comsat into the Telenor family has been evolving for a year, the latest metamorphosis of Comsat, a pioneer in delivering satellite communications for the safety of ships at sea. Upon visiting recently with **Guy White**, Telenor's Southbury, Conn. station director, it is apparent that the combination is yielding positive and immediate benefits for the maritime community users.

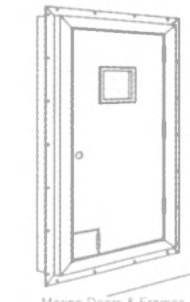
From the beginning

The Southbury Land Earth Station (LES) is, if nothing else, seated in one of the most picturesque spots in Connecticut, enhanced greatly by the fall foliage in late October. Contracted for construction on November 28, 1973, the LES began providing signals for the commercial mariner in 1976, with the launch of the Marisat satellites.

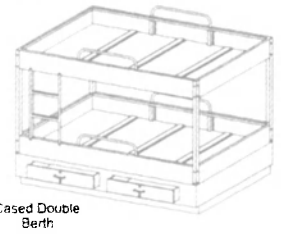
(Interestingly, one Hughes-built, Telenor-owned Marisat satellite is still in operation, making it the world's oldest operating commercial satellite. It is still piloted by Telenor from Bethesda, Md., and as a back-up, from Southbury, Conn. It is leased to the National Science Foundation and is used to supply a communication link — the only satellite

Telenor's Southbury, Conn. Land Earth Station is ideally located to provide seamless satellite communications.





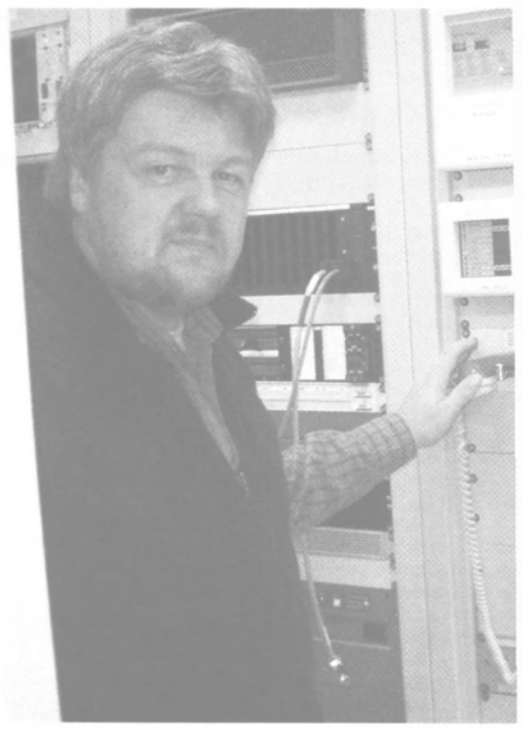
Marine Doors & Frames



Cased Double Berth

communication link - to Scott Station, South Pole).

It is the Southbury LES' scenic locale that made it a natural for the LES, though not for aesthetics alone. As White explained, topography is the key. "We, for the lack of a better term, sit in a bowl, which effectively shields the station from interference from terrestrial microwave towers ... and there are a lot of terrestrial microwave towers." Plus, he points out the location's good circuit connections to both New York and Boston as an advantage. In addition, the LES has an almost personal source of power, as it is connected directly to the nearby Shepauge Dam's hydroelectric plant (both dam and plant are



Demanding customers are the norm for Telenor's Southbury LES. Station director **Guy White** shows the hotline to NASA's Space Shuttle.

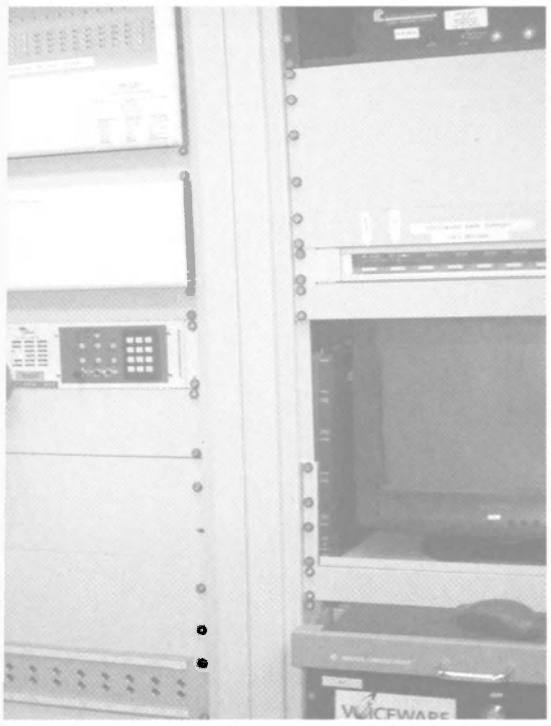
Connecticut's largest), which is powered by the waters of the Housatonic River. This provides a reliable, clean source of power, with White emphasizing 'reliable.' "We double up on everything around here ... outages are not acceptable."

While some would dismiss this as perhaps marketing hype, coming from White, a 23-year employee of the station with the technical knowledge to fix any-

It *IS* Rocket Science!

The original Marisat system providing satellite communications at sea included three satellites ... one for the Pacific Ocean, one for the Atlantic Ocean, and one for the Indian Ocean. Comsat controlled the Atlantic Ocean satellite, a unit which "stopped talking to us," according to **Guy White**, Telenor's Southbury, Conn. station director. Still working, the team had to devise a plan to navigate the now silent bird. Comsat's solution: Ripple Detector. In short, satellites naturally wobble, so based on the communication wave differentiation, the Comsat team used this information to fire thrusters, and did so to correctly "fly the bird for 1.5 years with not telemetry," said White proudly.

The Atlantic and Pacific satellites eventually died, but today Telenor still operates the original Indian Ocean Satellite, handed over from an Italian/Japanese collaboration that initially operated it. Repositioned, the satellite today is the world's oldest commercial satellite still in operation, providing a vital communication link to the South Pole.



thing on premises, it is undeniably true.

"We take safety at sea very seriously," he said. Factor in, also that the LES provides the communication links to Air Force One and the space shuttles, and the magnitude of reliable service is clear. "I never want to get a call from Kennedy Space Station and hear that a shuttle launch was aborted because of us."

While the station's five massive dishes (four active, one back-up) provide 95 percent of the station's visual impact from the outside, the guts of the operation and the roughly $150 million worth of equipment housed in the technical shed is a real eye-opener.

... --- ...

A veritable smorgasbord of communication technology from the "stone age" Telex to the station's new No. 7 signaling switch — which handles the equivalent of 180 T1 lines — are housed here. The new signaling equipment, White said, is proof of Telenor's commitment to reliable communication and the Southbury Station. According to White, the new No. 7 switch, which takes full advantage of the latest technology to deliver expanded communication capacity in a condensed size, provides more flexibility, capability and is a move toward a "self-healing network" concept. Another major upgrade complements of the new parent company is a brand new Uninteruptable Power Supply (UPS), a major enhancement for the Southbury LES and a virtual guarantee that a power problem will not take the station offline.

With the high commitment to the latest communication and computing gear, it is ironic to note that the station uses — in addition to computerized and electronic means — Morse Code as part of its warning system to alert staff engineers to problems.

Telenor's acquisition of Comsat followed an interesting period to Comsat, as less than a year previous it had been acquired — evidently, for quick resale — by Lockheed Martin. Despite an incredible number of corporate consolidations and takeovers in corporations around the world — some justified, some mystifying — this collaboration, by all appearances, will continue to be a rousing success. Before the acquisition, "Comsat and Telenor technical voices usually teamed and were always the loudest," at Inmarsat meetings in London, said White. "Telenor is very clever," he said, noting how the company was a pioneer in integrating GSM cellular sites at sea so cellular phone users out of range can "roam" through the satellite. "We (Comsat) brought to the equation software knowledge and switching capability — we build things here off the shelf."

@SEA(mail) Launched

Marlink launched @SEA(mail) Network, an addition to its @SEA(mail) portfolio of optimized communications solutions. @SEA(mail) Network offers all the user benefits and value-added services of the @SEA(mail) Standalone version, such as full duplex data transfer capability, high compression ratios, crash recovery feature, fax and telex transmission, virus scanning and message filtering. By providing multiple e-mail addresses per subscription, each vessel/subscriber can allow separate and private use of e-mail correspondence to members of the charters or crew, or other persons aboard ship. @SEA(mail) Network is suitable for operation on: Inmarsat A, B, B-HSD, M, Mini-M, GAN/M4, Fleet ISDN, Iridium, ISDN and PSTN landlines, as well as most GSM systems.

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Sailor Fleet77 Launched

Sailor introduced the new satellite communications terminal Sailor Fleet77. Sailor Fleet77 enables each vessel to stay on-line constantly at no charge from Inmarsat, with only charges for the transfer of megabytes. The vessel's various needs for voice, fax, e-mail and Internet services can be covered by the Sailor Fleet77 system. The Sailor Fleet77 communications terminal offers high-speed and cost effective voice and data communication based on either MPDS (Mobile Packet Data Service) with constant on-line access or 64 kbps ISDN connection.

Circle 7 on Reader Service Card
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Nera Introduces F33

Nera SatCom AS, together with Inmarsat, introduced the Nera F33 product concept to fill the gap between the existing Inmarsat Mini-M service /Nera WorldPhone and the global Inmarsat Fleet 77 service/Nera F77. The new Nera F33 is based on the Inmarsat Fleet F33 service concept, providing the light marine market with improved data communications from equipment suitable for the demands of today's commercial and leisure fleet. The launch of the service is due in early 2003. For vessels operating on deep-sea global routes, the new Nera F77, based on Inmarsat Fleet 77 services would be the preferred installation. Fleet F33 is designed to fill the gap between the two existing services. The F33 terminal antenna is considerably smaller than the global Nera F77, making it suitable for smaller vessels and any light marine vessels with IP-requirements such as smaller yachts, fishing vessels and smaller coastal fleet.

Ottar Bjaastad, Nera Maritime Business Manager, said, "By launching Nera F33 we are responding directly to a market sector whose data requirements have outgrown the capabilities of Mini-M, but which may be exceeded by the Nera F77's comprehensive service offering.."

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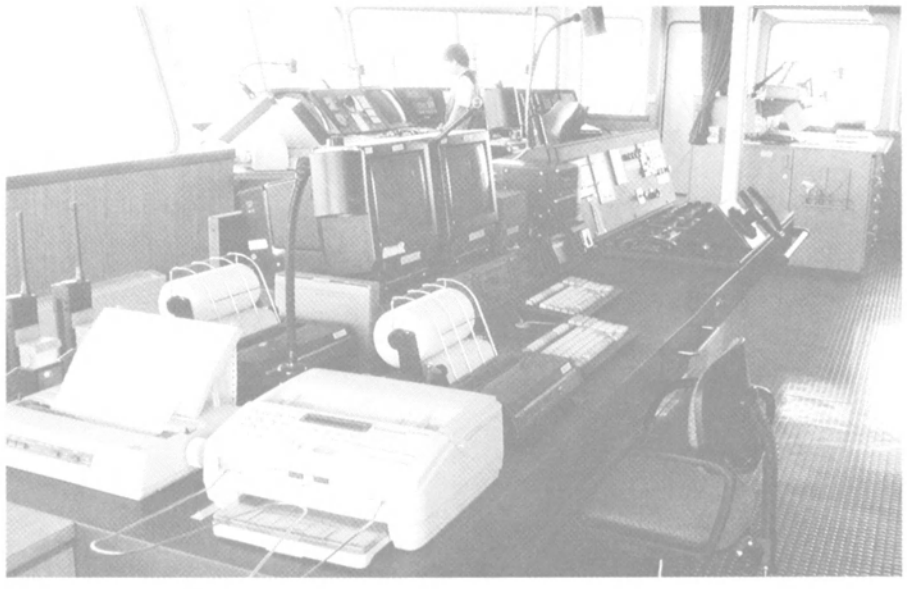
MTN to Supply NCL Ships

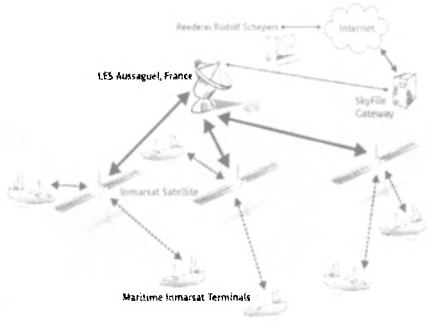
PCTEL, Inc. is providing wireless access hardware and software products to the cruise line industry through its commercial agreement with Maritime Telecommunications Network (MTN). MTN, a provider of maritime communications deployed PCTEL's WLAN Network Gateway, Roaming Client and Installation Wizard software products

Sending Screws, Pistons and Lube Oil via Satellite

In just a few years, the Schepers shipping line communications have evolved from telex punched tape to a super-fast and easily operated communications system

By Dr. Klaus Neugebauer





At the Rudolf Schepers shipping line based in Elsfleth in the Oldenburg region, shipping is a business with traditions. While the owners' grandfather sailed on inland waterways, 50 years ago their capacity was expanded by the addition of some coastal motor vessels up to 150 tons. Since the 70s, the company's core competence has become the worldwide chartering of container ships to big shippers like Maersk or CSAV. The cargo space is made available and the ships have been subjected to technical refits and the crews increased. Together with the Heinrich Schepers company within the same line, the family concern now operates 12 container vessels of 1,100 to 2,500 TEU.

"Our ships are everywhere. North and South America...South Africa...the Near East...the Caribbean. Because we go everywhere, we have to be obtainable everywhere," explains Rudolf Schepers, the company's senior boss.

However nowadays this is no big deal. Up to the middle of the 90s at Schepers, a telex system with its punched tape was responsible for contacts between the ships and the headquarters. From 1995, initially on a trial basis, the Inmarsat satellite communications system has been in use. In the beginning the system was run by DeTeSat through its own ground station, but now France Telecom is in charge.

"At that time the ships reported their positions every two days," reminisces Jan Schepers, the junior boss of the line. "Nowadays we get in touch with each vessel two or three times per day, by e-mail." Since 1999 this has been the job of the SkyFile 3.0 program, which the operators can download free-of-charge from the Internet, or simply install from a CD-ROM.

Above all communications have become simpler, and don't involve much work. Just a few years back Volkert Stoll, the superintendent of the shipping company, and his staff used to spend up to six hours per workday to deal with a six-week commission, which arrived on board by fax. About 15 pages of text were generated. "Our inspectors then cut the lube oil order out with a pair of scissors, then the electrical order, then the order for paints." These cuttings were then pasted on to a page bearing the company heading, and faxed on to the various suppliers.

Today all that is unnecessary.

You just select the Excel files from the incoming e-mails, and copy them into the e-mail messages for the suppliers. This cuts down the work to about an hour. Reports of damage on board are also faster and simpler to make now. The ships used to be equipped with instant cameras. For unusual breakdowns, like a faulty piston in the diesel engine, photographs had to be taken. These pictures, which weren't of particularly good quality, arrived in Elsfleth three weeks later by marine mail. Simultaneously expensive phone calls had to be conducted - if this was at all feasible. Nowadays all the ships have digital cameras. The engineer on board photographs the technical fault or the damage to the cargo, and transmits the shots by E-mail to the shippers' headquarters. These visual documents state the place, the time, and even describe the weather conditions, and are promptly forwarded to the supplier or the insurer. The partners can react immediately and order replacement parts, maybe pumps, whole systems and so on. This wasn't always the case. With the previous Inmarsat units the staff selected the land earth station themselves, and dialled the number. For Schepers this was an enormous advance on the elaborate telex procedure. Nowadays these transmissions function completely automatically and take just a few seconds. "There was no need for any training," comments Wolfgang Kalus, the marine inspector at Schepers. "It was all very simple. We installed the system on board ourselves, and the software too."

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SeaWave Makes Maritime Communication Seamless

SeaWave LLC's marine communications suite includes SeaWave Navigator 2.0 and SeaWave Integrator, the latter is a hardware device that comes bundled with SeaWave Communicator 3.0. SeaWave Navigator 2.0 is Windows based software bundled with a DSP modem and works with most existing SSB radios specifically for low bandwidth use.

SeaWave's proprietary HFVelocity, utilized in both products, provides enhanced data compression and state-of-the-art signal processing, Auto Connect and Automatic Link Establishment (ALE).

SeaWave software continuously scans all available HF frequencies during periods of inactivity. When a communication task is initiated, the system automatically tunes the radio to the optimal frequency to route e-mail and download forecast information so it is waiting for the user on their PC.

SeaWave Navigator 2.0 can obtain data rates comparable to some satellite providers for a lower cost, allowing mariners to send and receive e-mail and retrieve weather information. SeaWave Navigator 2.0 with proprietary HFVelocity retails for under $1500.

Arriving in January is the SeaWave Integrator (pictured), a full service marine communications system that incorporates satellite, GSM, HF and Internet technology.

SeaWave Communicator 3.0 is Windows-based software that comes bundled with the SeaWave integrator hardware device. Least cost routing and HFVelocity based ALE simplify shipboard administration for voice and data, are designed to reduce both communication and administrative costs.

SeaWave Integrator hardware and SeaWave Communicator 3.0 software can determine the least expensive way to send a message, whether via satellite, GSM or HF. A number of factors determine how a message is sent, signal strength, cellular range, message size and satellite availability to name a few. The SeaWave Integrator bundle will cost about $3000.

SeaWave makes it easy to bill crew for usage, traffic is measured as it passes through the Integrator and the end result is a consolidated and easy-to-read hotel-style invoice. SeaWave can even reconcile the charges from the different satellite carriers into their advanced billing system.

SeaWave Navigator 2.0 and SeaWave Communicator 3.0 are launching pads for value-added marine software applications such as MaxSea, a leader in maritime navigational software. MaxSeaWeather has been optimized for use with the SeaWave platform and allows for wireless retrieval and overlay of weather data on to charts. Other applications include sea surface temperature, wind and wave, weather maps, text forecasts, and NOAA weather buoy information.

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The Maritime Transportation Security Act 101

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

After a series of procedural maneuvers, the 107th Congress adopted the Maritime Transportation Security Act as one of its final bills prior to adjournment. President Bush signed measure into law on November 25, 2002 (Public Law 107-295). The new law represents the most significant expansion of maritime and port security authority since enactment of the so-called Magnuson Amendment in 1950. This Act contains a number of provisions authorizing the Coast Guard and other agencies to establish maritime security standards and mandate certain security enhancements to be undertaken by maritime industry.

Vulnerability Assessments

The Act requires facility and vessel vulnerability assessments to be done by the Coast Guard. The vessel vulnerability assessments will be limited, under this provision, to identification of vessel types that pose a high risk of being involved in a transportation security incident. The term 'transportation security incident' is defined in the Act as a security incident resulting in a significant loss of life, environmental damage, transportation system disruption, or economic disruption in a particular area. It is expected that tank vessels, passenger ships, liquefied natural gas (LNG) and liquefied petroleum gas (LPG) carriers, and container ships will be found vulnerable (at least to some extent) under this criteria.

Similar to oil spill response plans under the Oil Pollution Plan of 1990 (OPA 90), the Secretary of the Department in which the Coast Guard is operating has been tasked with preparing a National Maritime Transportation Security Plan and Area plans for each Captain of the Port (COTP) Zone. Commercial vessels and facilities that the Coast Guard believes may be involved in a transportation security incident will be required to prepare and submit to the Coast Guard security plans for deterring a transportation security incident to the maximum extent feasible. The vessel and facility plans must be consistent with the National and Area plans; identify the qualified individual having full authority to implement security actions; identify and ensure by contract or other means approved by the Secretary the availability of security measures necessary to deter to the maximum extent practicable a transportation security incident; and describe the training, drills, and security actions of persons on the vessel or facility to be carried out under the plan. The plan must include provisions for establishing and maintaining physical security, passenger and cargo security, and personnel security; controlling access to secure areas of the vessel or facility; procedural security policies; communications systems; and other security systems. Unlike the OPA 90 situation, the vessel and facility plans are not limited to solely relying upon private resources, but the full extent of public resources in vessel and facility security plans is not yet clear. The Coast Guard must promulgate its regulations for vessel and facility security plans by April 1, 2003.

"The price of liberty is eternal vigilance."

— Thomas Jefferson

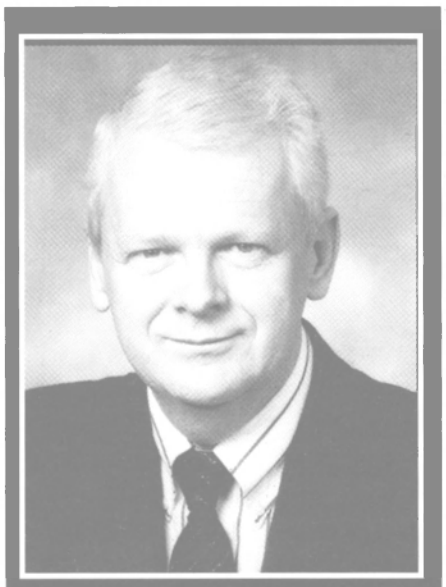
The vessel and facility security plans must be submitted to the Coast Guard within one year after the Coast Guard promulgates its regulations. Vessels and facilities will be allowed to operate under unapproved plans for up to one year, if they certify they have taken various measures. This will provide the Coast Guard with time to review and approve the plans.

At the same time, the International Maritime Organization (IMO), a specialized agency of the United Nations, has adopted international standards for ship security plans. The U.S. and IMO provisions have numerous similarities, but also some striking differences. Both require designation of company and ship security officers, in addition to development of the security plan. The IMO plan, though, will be prepared in accordance with IMO guidelines and will be approved by the flag state or its authorized agent (generally an IACS classification society). The U.S. plan will be prepared in accordance with USCG regulations and will be approved by the Coast Guard. The IMO plan will be required of all commercial vessels engaged in international trade of 500 tons gross tonnage and greater. The U.S. plan will be required of vessels designated by the Coast Guard. Tentatively, the IMO requirements will come into effect on July 1, 2004. The U.S. requirements will come into effect not later than April 1, 2004, and probably earlier.

Transportation Security Cards

No person will be allowed to enter secure areas of a vessel unless he or she possesses a Transportation Security Card issued by the U.S. Coast Guard or is accompanied by someone who has such a card. Cards would be issued unless the individual is determined to pose a security risk. Transportation Security Cards would be required of the following:

- an individual allowed unescorted access to a secure area designated in a vessel or facility security plan;
- an individual issued a license, certificate of registry, or merchant mariners document by the U.S. Coast Guard;



Dennis L. Bryant, Senior Maritime Counsel at the law firm of Haight Gardner Holland & Knight, Washington, D.C., is a contributing editor of MR/EN.

- a vessel pilot;
- an individual engaged on a towing vessel that pushes, pulls, or hauls alongside a tank vessel;
- an individual with security sensitive information; and other individuals engaged in port security duties.

A Transportation Security Card may only be denied to one of the above individuals if the Secretary determines that the individual has been convicted within the previous seven years of a felony that either presents a terrorism security risk or causes a severe transportation security impact; has been released from incarceration within the preceding five years for such an offense; may be denied admission to the United States or removed from the United States under the Immigration and Nationality Act; or otherwise poses a terrorism security risk to the United States. A potential problem relates to foreign crewmembers. The Immigration and Naturalization Service (INS) is currently issuing 'detain on board' orders to large numbers of foreign crewmembers. It is unclear whether these crewmembers with thereby become ineligible for Transportation Security Cards. Since 'detain on board' orders have been issued for some senior shipboard personnel, such as chief engineers, this may present practical problems for ship operation. The Card issuance program would, though, include provisions for waiver and for appeal.

Enhanced Crewmember Identification

Crewmembers on vessels calling at U.S. ports will be required to carry and present on demand an identification credential acceptable to the U.S. Coast Guard.

It is anticipated that a mariner's identification card issued under standards being developed by the International Labour Organization (ILO) would meet this requirement.

If an international agreement providing for a uniform, comprehensive, international system of identification for seafarers is not negotiated within 24 months following passage of this measure, the Secretary is to present to Congress a draft bill that would establish a uniform, comprehensive system of identification for seafarers. The relationship between enhanced crewmember identification and Transportation Security Cards is not yet clear.

Grants

The maritime security grant program would be made permanent (subject, of course, to funding). Grants would be administered by the Maritime Administrator and available to port authorities, facility operators, and state and local agencies required to provide security services or funds to implement provisions of Area Maritime Security Plans or facility security plans. Costs that could be funded under these grants include conducting vulnerability assessments, acquiring and operating security equipment, and costs associated with correction of Coast Guard-identified security shortfalls. Funding levels for the grant program have not been resolved. While on-shore facility owners and operators have at least some hope that grant funds will offset the cost of mandated security upgrades, vessel owners and operators are again left holding the bag. The Act provides no grant monies for the costs of ship security upgrades. Container upgrades alone could cost hundreds of dollars per unit - and there are thousands and thousands of containers. Meanwhile, the failure of Congress to enact appropriations legislation has delayed funding of any new grants until at least April 2003.

Foreign Port Assessments

The Secretary has been tasked with assessing the effectiveness of antiterrorism measures maintained at foreign ports from which vessels depart on voyages to the United States or that otherwise present a security risk to international maritime commerce. Factors to be considered in the assessment include screening and security measures in place at the port, licensing or certification of compliance with appropriate security standards (which would appear to mean standards developed by IMO), and the security management program of the port. If the Secretary finds that a foreign port does not maintain effective antiterrorism measures, the Secretary is to notify the country of the finding and recommend steps to improve the antiterrorism measures at the port.

The Secretary may also prescribe conditions of entry into the United States for any vessel arriving from that port or carrying any cargo or passengers originating from or transshipped through that port. The conditions of entry could be imposed 90 days after the foreign government has been notified of the finding that the port does not maintain effective antiterrorism measures (unless the Secretary finds that such measures have been adequately improved). The conditions of entry could be imposed immediately if the Secretary determines that the threat is severe. In extreme situations, the Secretary could prohibit U.S. port calls by ships arriving from foreign ports without effective antiterrorism measures.

Automatic Identification System

The Coast Guard is authorized to require installation and operation of automatic identification systems (AIS) on self-propelled commercial vessels of 65 ft. (19.8 m) and longer, vessels carrying more than a specified number of passengers for hire, towing vessels of more than 26 ft. (7.9 m) and 600 hp, and any other vessel determined appropriate. Implementation dates are as follows:

- On and after January 1, 2003, for any vessel built after that date;
- On and after July 1, 2003, for any vessel built before 2003 that is a SOLAS passenger vessel, a tanker, or a towing vessel engaged in moving a tank vessel; and
- On and after December 31, 2004 for all other vessels.

Container Performance Standards

The Secretary, in consultation with the Transportation Security Oversight Board, is directed to establish a program to evaluate and certify secure systems of international intermodal transportation. The program would include establishing standards and procedures for screening and evaluating cargo prior to loading in a foreign port for shipment to the United States either directly or via a foreign port; establish standards and procedures for securing cargo and monitoring security while in transit; develop performance standards to enhance the physical security of shipping containers, including locks and seals; establish standards and procedures for allowing the U.S. Government to ensure and validate compliance with the program; and any other measures the Secretary considers necessary. The Secretary has also been tasked

to develop an antiterrorism cargo identification, tracking, and screening system for containerized cargo shipped to and from the United States.

See the discussion above regarding the cost of upgrading shipping containers, in the 'Grants' section. The industry may well see itself pushed toward having two types of containers - those accepted in the United States and those accepted in the rest of the world. Initially at least, one should expect a shortage of U.S.-certified containers, particularly in smaller foreign ports.

Civil Penalties

Civil penalties of up to $25,000 can be imposed for violation of the maritime security statutes or regulations.

Expedited Rulemaking

The Secretary is authorized to promulgate interim final regulations implementing the maritime security statutes without having to comply with the usual provisions of the Administrative Procedures Act, such as advance notice and comment. Final regulations, though, would have to meet the usual requirements.

What this means is that implementation will be greatly expedited, with minimal input from the regulated community. The result will be that any initial mistakes will not be caught and corrected before carriers and others will have to spend time, money, and personnel resources to comply.

Extension of Seaward Jurisdiction

The Espionage Act of 1917 (which first established a port security program for the United States) has been amended to extend jurisdiction out to 12 n.m. from the baseline from which the U.S. territorial sea is measured. A civil penalty of up to $25,000 could be imposed for violation of the Espionage Act or regulations promulgated thereunder.

Transmittal of Information to Customs Service

The Customs Service is now authorized to require that information pertaining to cargo to be brought into the United States or to be sent from the United States be provided to the agency through an electronic data interchange system prior to the arrival or departure of the cargo. Carriers must notify the U.S. Customs Service of any cargo tendered to the carrier for transportation that is not properly documented and that has remained in the marine terminal for more than 48 hours after delivery.

Efforts to Enhance Maritime Security

The United States will continue its efforts to increase transparency in control and ownership of vessels. It will also work to enhance maritime transportation security, particularly intermodal transportation. In this respect, it will be joined by the majority of the community of nations, although there will be differences in specific measures to be relied upon to achieve the goal. One program that is causing discord is the Container Security Initiative (CSI) of the Customs Service. The European Commission contends that the program, under which U.S. Customs personnel are assigned to various foreign ports to assist in the pre-examination of containers bound for the United States, unfairly discriminates against smaller ports.

Conclusion

We have experienced a flurry of activity from IMO, the Congress, and the various federal agencies. More activity will follow as flag administrations implement IMO provisions and the federal agencies implement new legislative authority. Neither the industry nor the agencies yet know exactly how maritime security requirements will turn out. We are in a period of trial and experimentation. Agencies will make mistakes and need to re-adjust. Industry will encounter confusion and frustration. These conditions are normal during periods of rapid transition. Maritime security is truly a work in progress. The important thing, for now, is that everyone move in the same general direction.

The need to enhance maritime security was made painfully evident by the terrorist attack of September 6, 2002 on the French supertanker LIMBURG in Yemen. Now, the goal is to enhance maritime security in a manner that maximizes the benefits while minimizing the costs. In the United States, the Coast Guard, Customs Service, and other agencies involved in the process should be looking to the maritime industry to assist in development of workable solutions. Many in the industry actively participated in the OPA 90 rule-making process, and the system benefited greatly from that involvement. Similar participation is called for in this situation. The agencies will move ahead in their rulemaking programs with or without industry participation. The rules, though, will be more efficient and impose lower costs if all affected by the programs are involved in the process. It is incumbent on government agencies to seek input from the regulated community. It is equally vital for the maritime industry to quickly provide its assistance. The parties must not forget that we are dealing with national and international security and that we face a nameless and daring enemy. No one truly appreciated the extent to which the maritime and other sectors of the economy were at risk of terrorist or other non-conventional attacks prior to the horrific events of September 11, 2001. Once it became apparent that there were fringe groups willing and able to launch raids on previously immune targets, the goal became one of reducing the risk to which various important elements of the national and international economic infrastructure were exposed.

The maritime industry transports the vast majority of international commerce. This is particularly true for the United States, which seems to be the current primary target for terrorist activity. Thus, it is incumbent upon those involved in U.S. maritime commerce to enhance their security and reduce their vulnerability.

Threats, risks, and vulnerabilities are dynamic. Reducing your risk to today's threat does not make you inviolate against tomorrow. You must continually improve your security programs to account for new plots and plans of Al Qaeda and other fringe groups.

As **Thomas Jefferson** is alleged to have said, "The price of liberty is eternal vigilance."

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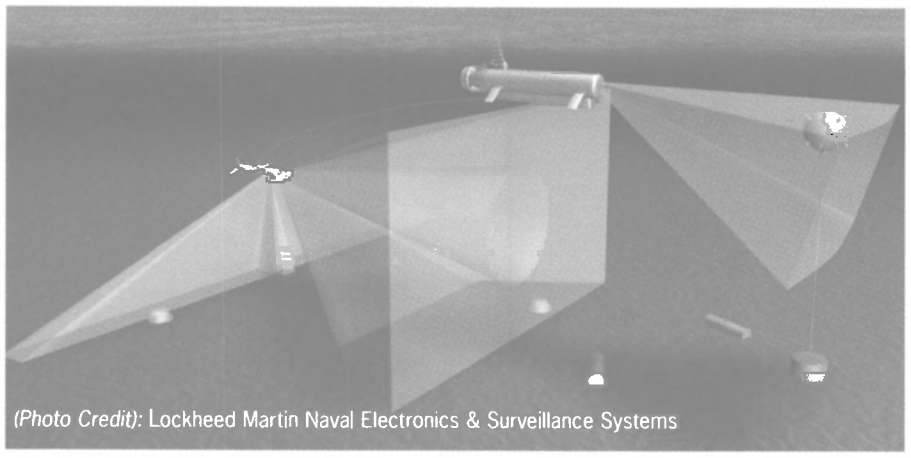
Underwater Intervention 2003 Set for New Orleans

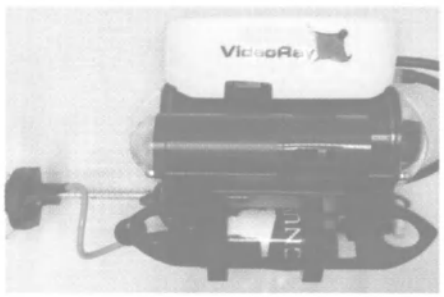
Dubbed "the most important three days for Underwater Contracting," Underwater Intervention is slated to convene from February 10-12 in New Orleans at the Ernest N. Morial Convention Center. With a full and diverse technical program and an impressive roster of exhibitors from around the globe, UI '03 seems to be on track to fulfil this claim. New Orleans is historically a favorite venue for Underwater Intervention, and in fact the exhibition is scheduled to be held in New Orleans through 2010. The spacious Convention Center provides enough floor space for over 250 exhibit booths. For the 10th consecutive year Underwater Intervention is co-sponsored by the ROV Committee of the Marine Technology Society and the Association of Diving Contractors International, Inc. The diverse conference program is divided into three tracks, and begins promptly at 8:00 a.m. on Monday, February 10. Topics include Diver Training, AUV Operations, Navigation and Technologies, Inland Diving, and Underwater Welding, as well as a session on Legal and Safety matters ... And that's just the first day. The ensuing two days are filled with a plethora of topics and speakers to interest many, ranging from Repair and Inspection to a Panel Discussion on Military and Commercial Cooperations and Offshore Operations.



(Photo Credit): Lockheed Martin Naval Electronics & Surveillance Systems

Full details can be found at: www.underwaterintervention.com

Cygnus Thickness Gauge Designed for VideoRay



VideoRay announced that the Cygnus Instruments Mini ROV Thickness Gauge has been specially designed for mounting on the 8-lb. VideoRay Pro ROV. Proven inside the USS Arizona battleship, the gauge is less expensive than the cost of diving excursions to measure thickness underwater and is especially useful for potable water tank inspections.

The gauge uses a technique known as Multiple Echo, which allows metal thickness measurements to be taken without first removing coatings. The unit is pressure tested to 500 meters. Dedicated software displays the time, date and thickness readings on the surface, and all readings can be stored.

Jon Sharland, Sales and Marketing Manager of Cygnus Instruments, commented, "The gauge is based on the larger ROV mountable unit which has already been proven many times in the harsh conditions of the underwater and offshore industries worldwide. We welcomed the opportunity to work closely with VideoRay to develop a dedicated unit that mounts onto the VideoRay Pro. Together, we can target applications, such as inside pipelines, that have previously been unfeasible using divers or large ROVs."

The Cygnus gauge was used on a VideoRay during a survey of the USS Arizona battleship, which sunk at the start of WWII in Pearl Harbor, Hawaii. During explorations by the National Park Service Submerged Cultural Resources Unit, the Cygnus gauge aboard a VideoRay traveled up to 150 feet inside the ship to test a wall for structural support and determine levels of deterioration to structural members.

VideoRay ROVs are used for underwater security and surveillance, search and rescue missions, wreck explorations, scientific research, and inspections of dams, culverts, piers, and other submerged structures.

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BP to Award Contracts for Subsea Technology

BP Exploration Operating Company Limited issued a Letter of Intent to Aker Kvaerner covering a frame agreement for the supply of steel tube subsea umbilicals for the UK North Sea. Kvaerner Oilfield Products, the Aker Kvaerner group's subsidiary specializing in advanced subsea technology, will provide project management, engineering and manufacturing of steel tube umbilicals.

The steel tube umbilicals will be manufactured at Kvaerner Oilfield Products' purpose-built facility in Moss, Norway.

The agreement has a duration of three years with an optional extension of an additional two years.

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Halmatic Building World's Tallest Yacht Mast

295-ft. (89.9-m) Mast to support 2,900 sq. m. of Sail

Halmatic is manufacturing a 295-ft. (90-m) mast that will be fitted on the world's biggest sloop, currently under construction by its parent Vosper Thornycroft Shipbuilding, part of the VT Group. Mirabella V will be around 246 ft. (75 m) long and its mast will support some 2,900 sq. m. of sail. Halmatic will use its long-standing expertise in composite manufacture to produce the hollow carbon epoxy mast, which will have a maximum cross section of 1.5 m and structural thickness of up to 32 mm.

The mast is manufactured in halves, with one comprising a complete length and the other divided into three sections.

Framework for the mold will be made from MDF cut on VT's advanced laser cutting and profiling machine. The manufacturing process, a similar method to that used in the production of Grand Prix racing cars and the aerospace industry, will consist of layers of cloth pre impregnated with resin made pliable and laid on top of each other. A vacuum bag will be used to create the required pressure every few layers. Structural expertise will be provided by Hamble-based High Modulus, who are involved in composite engineering aspects for the total Mirabella project.

At regular intervals during the build the mast will be cured using a heat process with temperatures up to 70 degrees C. Carbon compression tubes will be pre-fitted to coincide with the position of each spreader. It is estimated that some five tons of cabling will be fitted within the hollow centre of the mast, including a mass of sensors to monitor the sail performance. Finally, the sections of the mast will be glued together using an epoxy adhesive before the mast is stepped following the Mirabella V's launch in May 2003.

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Marlow to Supply Mooring System for GOM

Marlow Ropes won a contract to design and supply polyester mooring ropes for BP's 'Mad Dog' truss Spar. This is the first use of polyester ropes for a Spar based floating production system (FPS) and a first for a permanent mooring system in the Gulf of Mexico. The milestone contract is another world record for Marlow Ropes. The 'Mad Dog' Spar, moored in 4,420 ft. water depth with an 11 line taut leg system, will employ Marlow Superline polyester ropes. With a design minimum spliced breaking strength of 4,260 kips (1,932 tons), these polyester ropes will have the highest strength ever produced for deep-water mooring. The major rope segments, together with spares and test insert pieces, total nearly 84,000 ft. and will be delivered by October 2003.

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To the North, South — And A Little Island Sheltered

To those not familiar with the New York metropolitan area — the eastern end of Long Island is demographically multi-faceted. Traveling east on the Long Island Expressway, (the Island' main thoroughfare), the 118-mile long island, splits into two "forks," the North and the South. With the hamlets of Greenport and Orient Point situated on the easternmost points of the island on the north, the South Fork boasts the tony Hampton villages and the historical village of Montauk Point — literally the end of the earth before reaching the whitecaps of the Atlantic Ocean. While the two forks may differ in reputation and history — they have one similarity — a small island "sheltered" in between. Known as Shelter Island, this piece of land, which is as historical as it is controversial — is serviced by two ferry companies — North Ferry and South Ferry.

By Regina P. Ciardiello, managing editor

"Go east," was the mandate from my editor to find a story for the Passenger Vessel Annual, so I traveled as far east on Long Island as possible without getting my feet wet.

MR/EN stopped in to see Capt. **Cliff Clark** and **Bill Clark,** the brothers who operate the 200-year old South Ferry. As the fifth-generation of the family, the brothers manage the four-vessel fleet from their headquarters on the Southern tip of the Island — linking passengers and vehicles to the village of North Haven located in the South Fork of Long Island — just outside a small town known as Sag Harbor.

On the North Fork, the North Ferry terminal is located in the hamlet of Greenport, bringing vehicles and passengers to the northern end of the island, which can then link up to the south by driving about 4.5 miles via Route 114, to the South Ferry terminal.

While the company's traditions may be "old school," South Ferry's fleet exemplifies the new breed of ferry transportation. With myriad of refits and refurbs to its two older vessels — North Haven and South Ferry II — the company has added two new technologically advanced ferries — Southern Cross and Sunrise — to its fleet. With the addition of Southern Cross in 1998 and Sunrise this past summer, the vessels, could very well be "updated" versions of the Southside and Sunrise — two 65-ft. (19.8-m), yellow pine wooden boats that were constructed by Cliff and Bill's grandfather, **C.Y. Clark**, in 1925 and 1926, respectively, and the last wooden boats to built by the Clark family. According to historical reports obtained from South Ferry, these original vessels remained in service to Shelter Island until 1941 when North Ferry built its first steel vessel, Islander.

History in the Making

While both the North and South Ferry companies have historical roots planted on Shelter Island for generations, (North Ferry for more than 100 years, South Ferry since 1793), South Ferry designates itself as the oldest family-owned ferry company in

C.Y. Clark (pictured above), constructed the original Southside (now Southern Cross), and Sunrise — the last wooden boats to be built by the Clark family — in 1925 and 1926, respectively.

South Ferry is now run by the fifth generation of its namesake, with **Bill Clark** (at left), serving as vice president, and Capt. **Cliff Clark** as president.

the U.S. While some may balk at this statement, **Bill Clark**, South Ferry's vice president, touts 'blood is thicker than water," and invites anyone who disagrees with the statement to come forward and state their case. According to the South Ferry Crew Book, the company was established sometime during the late 1700's more than likely at the close of the Revolutionary War, when **Samuel G. Clark** came across the Long Island Sound from Connecticut into Shelter Island, where he purchased the property where a local marina now stands, and opened a ferry service to the Island. Some years later, he decided to settle on the south side of the Island, (where the newest generation of the Clark family still resides), and purchased an area of land to establish his farming efforts. It was on the south side, that Samuel decided he would remain, and once again, set up a ferry service (this time from the south side), via a rowboat that would aid boatless travelers to navigate between his land and what was then known as Hog Neck (now North Haven).

Moving ahead to the 19th Century, South Ferry progressed for its time, with travel to North Haven stepping up, so did ferry trips to and from Shelter Island, with the sons of the company's original owner, Samuel and David running the business. With Samuel moving beyond South Ferry in the late 1800's, David assumed the helm of South Ferry, and managed to expand the "fleet" in 1888 with the purchase of Elloine, a 32-ft. (9.7-m) boat, which towed a scow for cargo and carriages with horses tethered alongside. Following the death of David, due to a severe case of pneumonia, his son, **Clifford Y. Clark**, began the third-generation of South Ferry by building an even larger scow at the turn of the Century, which accommodated a carriage with hitched horse, known as Fannie. Measuring 20 x 10 ft. (6 x 3 m), the boat, which served with Elloine, made trips back and forth to carry passengers and supplies.

At the turn of the century designated South Ferry became official when it was incorporated under the laws of the State of New York in 1906, with all positions of officers and directors held by family members. Capt. C.Y. Clark took South Ferry, (and survived) past some of the most historical events of our time — WWI, the Great Depression and WWII. It was also at this time (the 1920's), that the State of New York brainstormed an idea to build a bridge linking North Haven to Hay Beach at Orient Point — due East of Greenport where the North Ferry currently operates from. Even though plans had been drawn up and serious discussions had,

M/V Sunrise, built by Blount-Barker Shibuilding, midway between Shelter Island and North Haven.

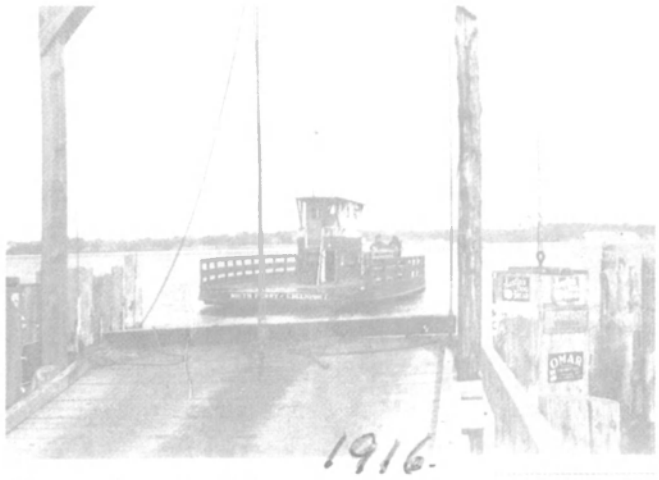
(South Ferry even held a role by renting out Elloine at $50 per day to take soundings for the New York State surveyors), the idea never came to fruition and was eventually dropped.

With no imminent plans for a structural link between the island, the ferries were the only means of transport to get not only passengers on and off the Island, but much-needed supplies as well. Seeing the rise in truck traffic during the 1940's, the Clark family designed and built the first known independent stanchions with no overhead obstructions, the concept, which had never before been introduced on Long Island, has gone on to become a popular method for ferry boats operating today.

Following WWII, C.Y. Clark remained at the head of the family operation, while extending the operations to his two sons, Donald and William (Capt. Cliff and Bill's father), who would be known as the fourth generation of Clarks to run South Ferry. According to Cliff Clark, who as the fifth generation of the family, serves as the company's president, "South Ferry is a work in progress, our ancestors had a vision and a passion — they saw what others didn't," he said.

William, who happened to be a "genius" when it came to General Motors 671 diesel engines, was (like his ancestors), born on Shelter Island, but didn't see it as this sleepy, little community, but as one that could thrive with the operation of a structured, innovative ferry business. While Donald concentrated his efforts on the operational side, William was hands-on, advancing the company technically, while focusing on the utmost in customer service. The new "Patriarch" of South Ferry relieved the company of all outside maintenance costs by working with machinist **Otto Hulse** in his Greenport machine shop. It was through Hulse, and self-taught mechanical knowledge, that William would go on to hold the title of Eastern

NRISE



That was then... "South Ferry" arriving at North Haven 1916 — the company's first double ended ferry, which was built by Capt. **C.Y. Clark.**

This is now... The Pilothouse of South Ferry's newest addition, M/V Sunrise, features innovations such as high efficiency deck floodlights and redundant navigation lights.

Long Island's "expert" on General Motors 671 engines. This was especially helpful when economic times were tough, especially before the cultural boom of the Hamptons and Shelter Island. Rather than balk on service, William would maintain the ferries, paint them, and fix the engines himself — rather than disappoint his customers by halting service. And this philosophy has become a mainstay. According to Bill Clark, vice president of South Ferry (and William's son), "there has never been a day where the ferry has not run." Even if the usual three-minute trip between the Island and North Haven, took three hours due to ice and/or snow, the ferry would still make its way across.

With the death of C.Y. Clark (William's father) in 1961, William assumed full responsibility of the company, furthering his vision and passion for South Ferry. He worked on additional improvements, such as new painting and coating methods - mainly zinc, which replaced what, was (at that time) the dangerous and ineffective red lead. According to **Cliff Clark**, his father's motto was, "Blast it, zinc it, and paint it." William found that zincing made a huge difference in the maintenance of the ferry fleet as it prevented the steel from rusting. In addition to his focus on the maintenance of the fleet, William Clark, gave just as much, if not more attention, to those who were (and still are today), the livelihood of the South Ferry operation — the customers. "Dad had a passion for giving good service and taking care of his customers," Cliff Clark said. "While he embraced new ways for operation, he was also a deeply spiritual person, with a strong faith." As a devout Christian, William believed that the core of the company's charter was "the desire to try new things based on Christian principles," furthering his spirituality and strong faith, which carried over into his business philosophy.

While William was a passionate, spiritual man, he was a devout businessman as well, sometimes sacrificing his own needs for those of his customers. Cliff remembers one specific time when his father, who had his car in line for the ferry on a busy summer day during a holiday weekend, and upon discovering that there was only a spot for one more vehicle, backed up his car and turned around, so that the line of cars behind him could load up the ferry.

Involved to the End

Even up until his last days, William still remained an active part of South Ferry — despite his deteriorating health. A few days before their father passed away, William and Cliff remember the day he was brought home via ambulance, making sure that his stretcher was raised to a point that he could see his ferry's namesake — Captain Bill Clark — pulling into the terminal as he arrived home. As the ferry went by, William didn't complement the gesture, he merely stated, "Keep her that way." Referring to the vessel's current condition. He died three days later on April 24, 1999 at the age of 86.

Today, both Cliff and Bill, oversee the daily operations of South Ferry, while continuing to instill their father's foundation for providing the utmost in customer service and innovation. Mainly with the addition of their newest vessel, M/V Sunrise, which was delivered from Warren, R.I.-based Blount-Barker Shipbuilding this past summer. The vessel is the beginning of the new generation at South Ferry. With its two Detroit Diesel engines, two Twin Disc gears and Rolls Royce propellers, the 101-ft. (30.7-m) double-ended ferry was built by Blount-Barker for $1.4 million. According to **Bill Clark**, South Ferry's vice president, Sunrise, which replaces the former Captain Ed Cartwright, has (instead of the traditional reverse gear bolted up to the engine) a stand alone reverse gear, which makes it easier to replace the vessel's Vulkan couplings. "If there's any (coupling) failure onboard on a busy day, this will enable us to change the coupling in just a few hours. Bill mentioned other innovations such as fixed engine room Inergen Ansul fire suppression system, which utilizes non-lethal gas. "The Inergen system puts out a fire in the engine room by reducing the oxygen level in the engine room," Bill said. "But leaves enough oxygen for breathing."

The ferry also employs high efficiency deck floodlights by Phoenix, two independent pilothouse system control stations with emergency back-up controls and redundant navigation lights, which Bill explained have a back-up fixture. "In case a bulb burns out, the ferry captain would hear and see both and audible and visual alarm that would release a back-up light until the bulb could be replaced.

"We want to provide good service here," Bill said, "The need for new equipment is driven by demand and the equipment matches the demand." Will South Ferry expand its fleet in the near future? While Bill did not elaborate on the subject, he did not completely rule it out either. "The trend on the East End of Long Island is growth," he said. "Sometime in the near future we will increase capacity, either by putting a 30-ft. (9.1-m) midbody into one of our existing boats or constructing another one." He added: "We (South Ferry) were very pleased with Blount-Barker, and if it gets to the point where we're ready to build again, we'd love to build another boat with them."

While Bill admits that 2002 was not as good a year for South Ferry as 2001, that does not mean that the ferry industry is in jeopardy. "There's more of a demand for ferry service," he said. "The trend is steady and it will evolve into the future. While there are no concrete plans right now, I am certain that the time will come when we will need a new ferry."

A New England Shipyard Comes of Age

By Regina P. Ciardiello, managing editor

When *MR/EN* traveled up to the New England coast this past fall as part of a New England shipyard swing, we were expecting to meet the great one himself — **Luther H. Blount** — who could be informally known as the "father" of New England shipbuilding. Blount began his career so many years ago with the construction of a 77-ft. steel catamaran, was the first of many greater and more technologically innovative vessels that would later earn the designation as Blount crafted.

Over the years, Blount oversaw the daily operations of his yard, managing to get his hands dirty on the overall production process. Carefully designing every vessel to a tee with a pencil and sketch pad, Blount had the ability to create designs of some of the most formidable passenger vessels, some of which are still in operation today — with literal freehand. But times have changed, and so has technology, both on the design and construction side. While at the age of 86 Blount still bikes over to his shipyard during the week to supervise, the countless moments that he spent sketching and creating, have since given way to the age of innovative CAD/CAM marine engineering software.

According to **Jake Stevens,** senior vice president/V.P. of Production, Blount-Barker Shipbuilding, the software utilized at the shipyard can literally take Luther's original designs and implement the most recent upgrades, while still maintaining their accuracy.

A New Business Breed

While Blount-Barker Shipbuilding continues to hold its presence on the Narragansett Bay as a premier builder, traditionally of ferries and dinner vessels, the company has joined the ranks of many other U.S. yards, thus entering the world of fast aluminum ferries, via a teaming with Australia's Crowther Multihulls. According to Stevens, Crowther wanted the opportunity to gain relationship with a U.S. yard, since the demand for these "fast cats" has jumped significantly in the last couple of years. Seeing their competitors gain a foothold in the world of fast aluminum catamarans, Blount-Barker jumped at the chance to brainstorm with Crowther, but first had to ensure that all their equipment and workers were up-to-date and ready to take on the task of creating an aluminum superstructure. Since the yard prides itself on its perfected detail and craftsmanship, Stevens worked with yard employees (both full-time and per diem) on upgrading their aluminum welding and fabrication technology. While Crowther has its own group of designers, engineers and naval architects, the welders and fabricators, and Blount-Barker, were the ones who ultimately will handle the task of creating this 40-knot fast cat — from start to finish.

On the job: A welder employed by Blount-Barker Shipbuilding busy at work on the yard's newest innovation – aluminum fast craft construction. *(Photo Credit: Regina P. Ciardiello)*

At press time, the aluminum superstructure was set to be a New Year's 2003 present to its owner, Portsmouth, N.H.-based B.B.O., LLC. The 124-ft. (37.7-m) vessel, which will carry up to 45 passengers, is being fabricated with aluminum from Trans Star Marine in Fort Lauderdale, Fla. The vessel also holds the distinction as not only the first fast cat in the New England yard, but as the first U.S.-designed aluminum catamaran. While Crowther is partnering with Blount-Barker, the company was responsible for the hull design. The

Sea State Helps Maximize Comfort

To maximize passenger comfort during transit to areas where whale watching will occur on Blount Barker s new aluminum hulled vessel, a motion control system designed by Australia's Seastate is installed. Due to the vessels operating profile, in which a large amount of time is spent at 25 knots or less, active trim tabs were incorporated into the system. To maximize the motion control capability T-foils have also been utilized. Both the trim tabs and t foils assist in the control of the pitching and rolling motions.

Control System

Seastate's motion control system is an automatic, electronically controlled and hydraulically operated vessel motion and trim control system. The system comprises hydraulically actuated control surfaces, the positions of which are controlled by commands from a central computer control unit. A motion sensor, featuring two angular rate gyros contained in a rugged, environmentally sealed canister, is located in the bridge. The motion sensor output is sent to the central control unit, which uses a sophisticated high-speed monitoring, and control algorithm to constantly monitor the motion sensor output and calculate the required control surface command.

Flaps / Trim tabs

A trim tab is mounted on each hull and is designed to control motion in both pitch and roll.
Flaps or trim tabs as they are often referred to, are a flat plate lifting surface hinged at or slightly forward of the transom. The flap forms an extension of the hull lines aft. By varying the angle of actuation of the flap, the flow exit angle at the transom is modified to produce lift. Flaps are effective at high and low speeds. Flaps are typically used in low or moderate speed applications where interceptor performance is limited.

T-Foils

A T-foil is mounted on each hull and is designed to control motion in both pitch and roll.
Lift is generated by holding the forward section of the lifting foil in position and actuating a trailing edge flap in much the same way as is achieved using a landing flap on an airplane wing. T-foils are capable of generating significant 'lift' in both the upward and downward directions.

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overall vessel was conceptualized via a group of architects and Bristol Harbor Group in Bristol, R.I. — a company that Blount-Barker had also tapped to work on its recently completed M/V Freedom, for the Delaware Port Authority, who purchased it in 2001, ultimately for use as a passenger ferry on the Delaware River in the vicinity of Camden and Philadelphia. Formerly known as M/V Essex, the vessel was originally built as a car ferry for operation on the Lake Champlain crossing from New York to Vermont. Ironically its hull was created by Blount in 1981. Incorporating Blount's original designs, Bristol Harbor Group transformed Luther's original sketches via the technology of computer generated lofting.

According to Stevens, the measurements from Luther's original designs were entered and lofted, then drawn via CAD to create, "a brand new vessel with a 21-year-old hull." In addition to its new superstructure, the vessel, which was launched on November 5, 2002, underwent further modifications, such as a conversion to double ended propulsion, enclosure of the main deck, addition of HVAC and marine engineering systems and provision of a partially enclosed upper deck viewing area.

The vessel's new distinction as a passenger/vehicle ferry enables it to now hold 600 persons - up from the original 149. As a result, the vessel was recently upgraded to current USCG Supchapter K requirements for this design.

At the time of *MR/EN's* visit, a selection of the 65 full-time yard employees were busy removing the latent vessel's equipment, virtually stripping it down so that it would be ready for the lift dock on November 1, 2002.

Still concentrating on its tradition of car/passenger ferries, Blount-Barker delivered a 101-ft. (30.7-m) double-ended ferryboat, Sunrise to South Ferry, Shelter Island, L.I. on July 30, 2002 to service the half-mile crossing of partially protected inland waters between Shelter Island and the South Fork of Long Island.

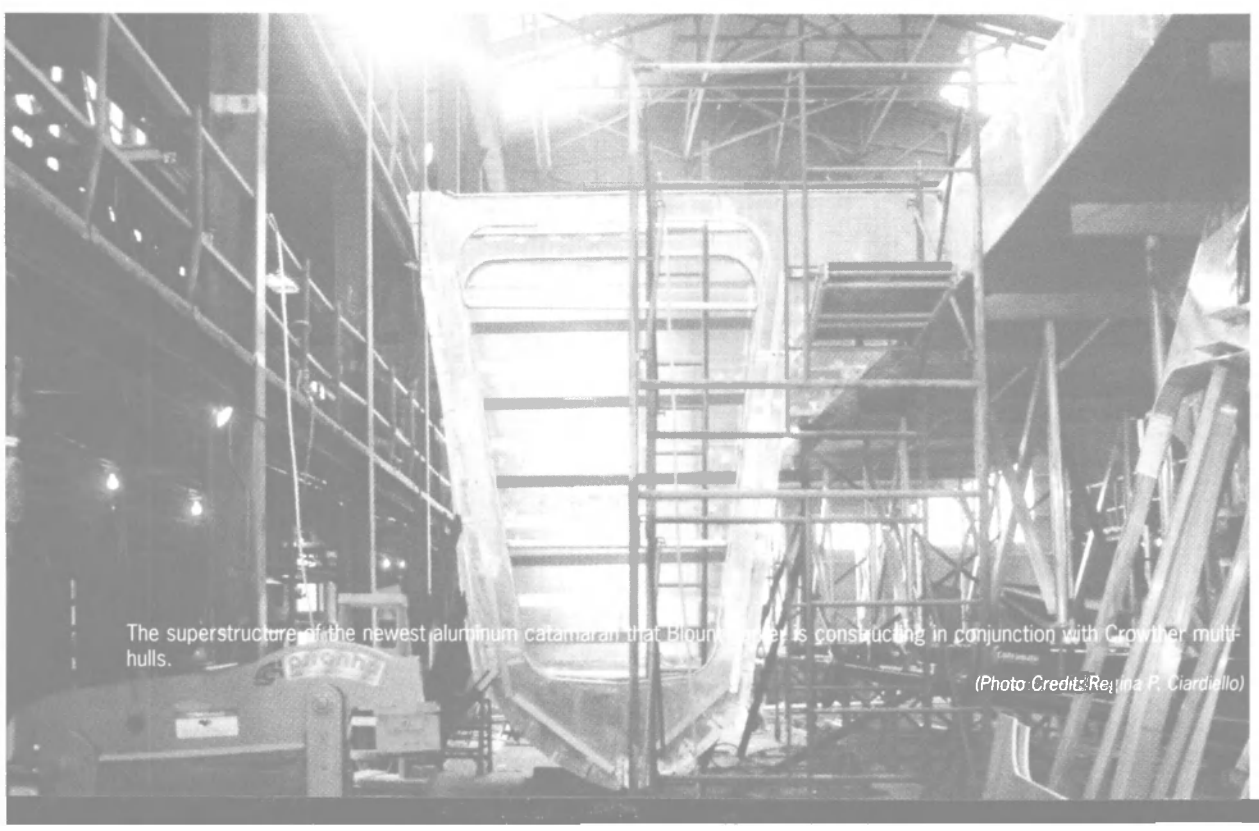
Built for the Clark family, owners of the family-owned ferry company, which began in the late 18th Century, Sunrise replaces the Captain Ed Cartwright, a 65-ft. (19.8-m) double ender built in 1931 at Staten Island, N.Y. (See related article on page 27). Measuring 101 x 39 x 11 ft. (30.7 x 11.8 x 3.3-m) ferryboat designed by Dejong & Lebet, Inc. was built to USCG Sub Chapter "T" Rules and Regulations for 150 passengers, and is a traditional car ferry with one open auto deck and enclosed aluminum side cabin with pilothouse. The vessel can carry a maximum of 50 cars or four semi-tractor trailers with a maximum load of 240,000 lbs., and is powered by a pair of Detroit Diesel Series 60 engines producing 400 hp at 1,800 rpm with stand-alone Twin Disc MG-516 gears. Sunrise is powered by two Detroit Diesel Series 60 engines producing 400 hp at 1,800-rpm with stand-alone Twin Disc MG-516 gears (4.5:1) for easy access to change Vulcan couplings and Detroit Diesel DDEC controls. The vessel is also equipped with two Rolls Royce, ice class, right hand, 54 x 40-in. pitch, four-blade propellers.

A New Beginning?

The repair and refit market could provide yet another new beginning for Blount-Barker Shipbuilding, as Stevens said the yard has increased its repair work in the last year-and-a-half. While repair work has potential, the yard must carefully schedule so not to interfere with the company's other ventures — Bay Queen Ferries and American Canadian Caribbean Line (ACCL) cruise vessels, which come into the yard every six months for routine maintenance and painting.

If repair does become a focus at Blount-Barker, the company's president and CEO, **Jim Barker** is quick to remind that new construction will not be pushed to the wayside. "Yes, we can do repair jobs in a quick and timely manner with a skilled workforce," Barker said. "But, new construction will be our main focus." Looking ahead, Barker sees the yard having the ability to accommodate small cruise ships, while continuing with its newfound interest in aluminum shipbuilding.

"For the next couple of years, we will stay with the 'fast cats,' going for the aluminum ferry market in all of our sheds," Barker said. "There's more of a demand for this market, simply because it is lighter, easier to fabricate and maintain."

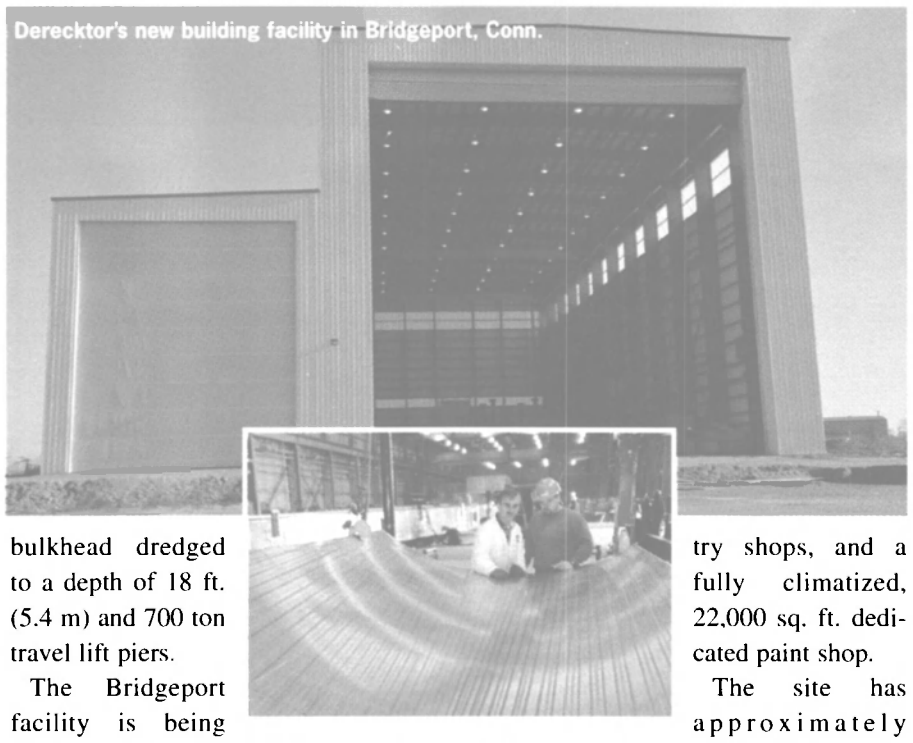


The superstructure of the newest aluminum catamaran that Blount-Barker is constructing in conjunction with Crowther multi-hulls.

(Photo Credit: Regina P. Ciardiello)

Derecktor Expansion in Bridgeport Extends Capabilities

The expansion of fast ferry building facilities has taken another gigantic step on the U.S. East Coast. In concert with a beehive of new capacity construction down south, Derecktor Shipyards recently announced that it has completed construction on a 45,000 sq. ft. main assembly building at its facility in Bridgeport, Conn., marking the completion of the second building on this 23-acre site, which is part of the development of the Bridgeport Regional Maritime Complex in Bridgeport Harbor. The new main assembly building consists of one 300 x 100 x 75 ft. (clear height) assembly bay and one 300 x 50 x 50 ft. (91.4 x 30.4 x 22.8 m) (clear height) assembly bay. This assembly building is the first of two main assembly halls to be constructed on the site which will provide a total of 168,000 sq. ft. of high bay area for the manufacture and service/repair of vessels ranging up to 400 ft. long.


Derecktor's new building facility in Bridgeport, Conn.

Other significant developments at the Bridgeport site include completing the retrofit of a 56,000 sq. ft. metal fabrication and sub assembly building in July of 2001, and waterfront improvements, scheduled for completion in September of 2003, which include 570 lineal ft. of bulkhead dredged to a depth of 18 ft. (5.4 m) and 700 ton travel lift piers.

The Bridgeport facility is being designed and constructed as a modern, state-of-the-art manufacturing and service facility. Manufacturing facilities will include construction of a total of 290,000 sq. ft. of new buildings, including complete metal working shops with an on-site CNC plasma cutting operation, along with high-tech welding and finishing operations, dedicated outfitting and service areas, dedicated carpentry shops, and a fully climatized, 22,000 sq. ft. dedicated paint shop.

The site has approximately 1,250 lineal ft. of protected deepwater frontage. On completion of the project, the frontage will include 500 ft. on the Harbor Channel with a channel depth of 35 ft. and 750 ft. of fully protected frontage on the Yellow Mill Channel with a permitted depth of 18 feet.

Launching and retrieving of vessels will be accomplished using a 700-ton travel lift. A 2,500-ton dry dock facility for larger vessels is planned for the near future. The shipyard is expected to employ up to 250 persons when fully operational.

In 2002, four vessels were completed at this site. An 85-ft. (25.9-m) freight boat for Fire Island Ferries, Inc. was delivered in June of 2002, and three 53-ft. (16.1-m) passenger ferries were delivered in August and September of 2002 for New York Water Taxi.

Currently under construction is the first of two 239-ft. (72.8-m) high-speed vehicle-ferries being built for the Alaska Marine Highway System. The first ferry is slated for delivery in December 2003. Preparations for building the second ferry are underway with a scheduled delivery of December 2004.

In addition to this new yard in Connecticut, Derecktor has two other facilities: Derecktor Shipyards in Mamaroneck, New York, is a full service yard for both yachts and commercial vessels, and Derecktor of Florida, a 17 acre yacht repair and refit yard in Fort Lauderdale, Fla. Among the significant factors in the success of the vessels built by Derecktor are the very high standard of aluminum fabrication and machinery installations as well as the weight conscious approach to vessel construction.

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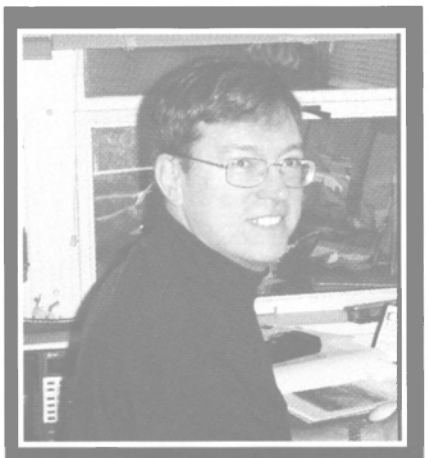
Price, Quality, Schedule

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



Beginning this month, John Waterhouse, P.E., president, Elliott Bay Design Group, Seattle, Wash., will be providing MR/EN readers with insight and innovation withn the passenger vessel industry.

That's the sign I saw once in a Maine boatyard. Big, bold letters. Underneath it said, "Pick two". That's the dilemma for any provider of goods or services. Low price, high quality, quick schedule. Our customers want all three objectives, our industry often has challenges in providing just one of those goals.

As the president of a naval architecture firm I have asked myself how we can deliver a better product on schedule at a competitive price. If a trade-off must be made, do clients want lower cost and higher risk in the shipyard? Do they understand that a properly scheduled job allows for better shipchecks and good information (hopefully) from the vendors? If budget is the overriding issue, what documents need to be produced by the engineering firm to achieve that result?

As I write this I am returning from a meeting with an unhappy customer. The project involved interiors, subcontractors, federal funding requirements and a 28- year-old ferry. We had missed some items, the shipyard was skilled at identifying change orders, and there were issues related to asbestos, lead paint, and coal tar epoxy. The client was faced with a substantial increase in project cost.

The meeting could have been a rant session on how we failed to provide the superior level of engineering they had come to expect from us. Instead, our collective focus was on identifying problems, seeking their root causes, and creating processes to prevent any recurrence of such problems on future projects. A thread uniting the problems was poor communications.

An engineer's challenge is to communicate with a customer about their explicit and implicit requirements. The engineer can then prepare calculations and designs using the principals of physics, appropriate regulations, and accepted design standards. He/she must then capture that work in documents, generally plans, specifications, and estimates. These documents form another type of communication with vendors, shipyards and regulatory agencies. This paperwork allows these other entities to conduct their own assignments of supplying equipment, building the vessel, and verifying that requirements have been met.

This client meeting I mentioned above allowed the engineer and the shipowner to exchange ideas on how to improve communication. As the engineering firm we need to hone our skills in eliciting information from the customer and then presenting what we think we heard back to the client. The shipowner needs to get clear direction and buy-in from their own internal customers. Collectively, we recognize that quality efforts in the design package reduces cost growth in the shipyard. It results in better bids with less risk of litigation at the end of the project.

My advice to the industry at large is to use the Maine boatyard sign as a starting point for communication. Use emails, letters, reports, sketches, checklists, models, renderings, and memos. Seek out whatever works to generate a dialogue about a project. Assume nothing. Ask questions and repeat back the answers. Time spent on these communications tools at the beginning of a project will help avoid surprises and increased cost. I can assure you that the Elliott Bay Design Group team will be focussing on good communication with our customers, vendors, and shipyards.

Manufacturing Better Bearings for the Marine Industry

In the last few decades, the maritime industry has faced increasing pressures to perform with less and still earn a profit. Fuel costs have skyrocketed. Labor costs have risen dramatically. Down time for repairs has cut into profit margins. Marine engineers and maritime operators have been looking for ways to make repairs more efficiently so they can streamline their operations and maximize their personnel and equipment.

Craft Bearing Company, Inc. has an answer.

Craft Developed A Better Bearing Design

Craft Bearing was founded with one goal in mind: to make world class split cylindrical roller bearings. Through American ingenuity, craftsmanship and pride in service, Craft Bearing has accomplished that goal.

Before Craft went into production, it spent years of exhaustive research and development to create a superior split bearing design. First, it made sure that its roller bearings had all the inherent features of conventional anti-friction cylindrical bearings; it then took the next important step of engineering and precision machined the entire bearing, seals and housing assembly into halves. All bearing parts can be easily separated and installed or removed from the shaft without removing the other components. Repair cost and down time is greatly reduced. The result is a better bearing for the maritime industry that is answering today's marine engineering needs.

Craft Builds Many Improvements Into Its Bearing

Craft's external self-aligning cartridges and pedestal/flange housings are machined from ductile iron for greater tensile and yield strength. Craft then uses a baked-on powder coating instead of a painted coating for a greater resistance to the elements and chemicals. Their innovative and patented roller cage assembly (made out of bronze on large and heavy duty sizes) has a fitted pocket for the rollers. This design assures the precise radial alignment of the rollers is maintained for maximum load characteristics and durability. In addition, the cage provides lubrication pockets, which further improve the bearing life. Featuring a black oxide finish, each clamp collar fits with precision forming the roller track. For sealing, Craft provides an aluminum triple labyrinth design that clamps to the shaft using a double "O" ring in the bore. The seal rotates with the shaft providing positive seal against the elements while not causing shaft or seal wear.

Craft's Product Line Continues to Expand

Craft Bearings are available in three duty ratings (S1, S2, S3) to best suit load, speed, and life requirements. Bearings are available from 1 7/16 to 32" bore and metric equivalent. Craft provides its customers with same day shipping on bearings through 12"/300 mm for its S1 and S2 series and prompt responses on larger sizes and special custom orders. Introduced early in 2002, Craft's Stainless Steel Split Pillow Blocks are manufactured with stainless steel housings, cartridge and hardware for use in harsh conditions that other bearings could not withstand. Craft's continued dedication to product improvement through research development and testing keeps it a leader in bearing design.

Craft Flange Bearings Prove Highly Effective in Marine Industries

The Marine Industry not only needs bearings that are both highly reliable and easily maintained, it needs bearings that can be installed in a variety of mounting situations.

To meet that need, Craft engineers have developed Flange Housings that are proving themselves to be valuable on propulsion shafting for such vessels as high-speed ferries, passenger car ferries, tow boats, and many other applications where flanges allow more efficient mounting than pillow blocks.

Over the past few years, the company has produced flange bearings across all product sizes from 2 3/16" thru 12" and they are increasing their stock on a regular basis.

Craft's Clients Realize Immediate Benefits

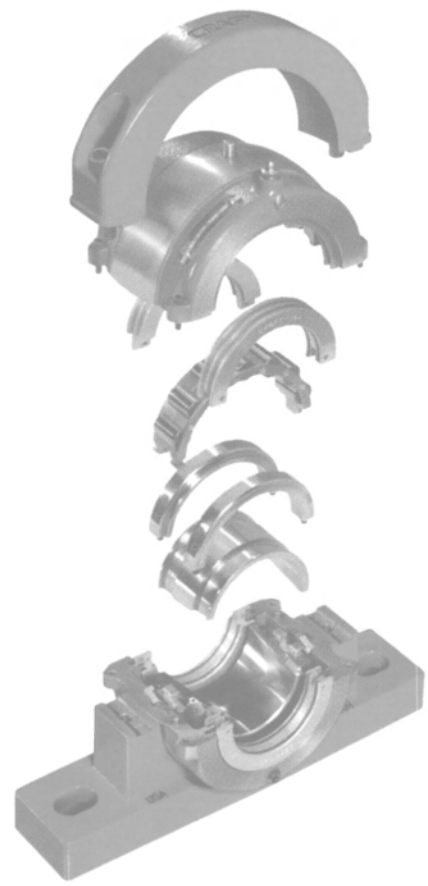
Craft's American-made split roller bearings are built to last longer, making them extremely reliable bearings for marine propulsion shafting, conveyors, deck machinery and fans. America's pilots appreciate Craft's dependability under heavy use in all sorts of weather and sea conditions. Engineers value the ease of maintenance and at sea repair. Craft's split roller bearings have greatly simplified and expedited both bearing inspection and bearing change out. Also, the bearing can be left in place for easier inspection and far easier replacement without disturbing ancillary equipment or shaft alignment. As a result, ship owners and captains benefit from the savings in reduced downtime between repairs.

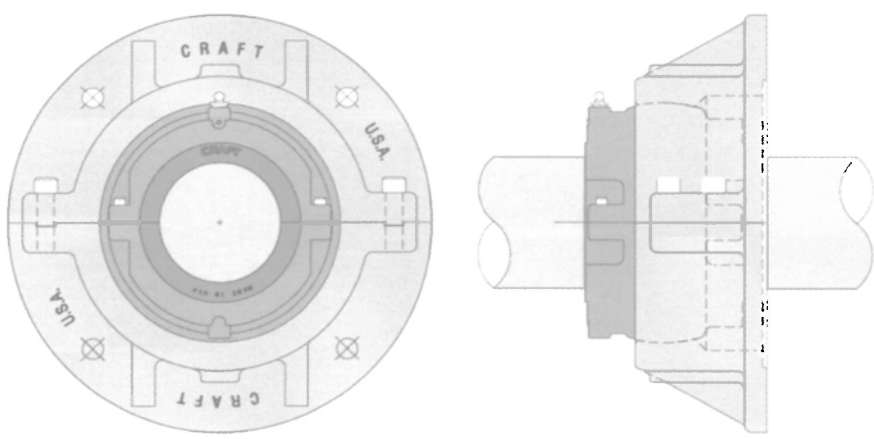
Craft Takes Customer Service To A Whole New Level

Another important difference with Craft is its absolute commitment to customer service. While some companies may not be responsive to their customers' needs, Craft is committed to providing technical support and customer service that is second to none. Through careful inventory control, its employees ensure same-day shipping for standard bearings at no extra charge and rapid response for special applications and custom bearings. In addition, Craft's experts are always available so customers who need assistance can talk to a human being, not a machine.

The Experts Pick Craft

Over the years, Craft has received important recognition for its American made split bearings. Their split roller bearings are approved by the Department of Defense and is the only split roller bearing that is Lloyds Register Type Approved. Also, their bearings are directly interchangeable with foreign split bearings.





Craft split bearing on a propulsion shaft.

Craft Forges Ahead With American Craftsmanship

Relying on American know-how, Craft Bearing has staffed its facility in Newport News, Virginia, with top American engineers, machinists and workers who take great pride in their work. After setting high standards for excellence, it has rigorously trained all of its employees to meet these standards. As a result, Craft consistently delivers high quality split bearings on time. The American-made Craft Split Roller Bearings are fast becoming the industry standard in marine applications worldwide. Over the years, Craft Bearings have proved their reliability and dependability time and time again.

For more information on specific applications, visit www.craftbearing.com or call 757-247-6000 or

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Old Dominion Gets New Research Vessel

The new research vessel, delivered to Old Dominion University's Center for Coastal Physical Oceanography by Gladding-Hearn Shipbuilding, is expected to commence a growing trend in research boat design -- toward smaller, faster and more versatile vessels — equipped to study a variety of sea characteristics.

Designed by Roger Long Marine Architecture of Portland, Maine, the all-aluminum vessel has a modified V-hull that measures only 55 ft. with a 17-ft. beam. Its five ft. draft allows the vessel to work in shallow waters of the Chesapeake Bay and along the Virginia coastline, up to 100 miles. The vessel's design firm and Gladding Hearn teamed to construct a similar size vessel for the University of New Hampshire in 1992, and have a similar 60 footer on the way for the Woods Hole Oceanographic Institute.

Temporary electrical cables can be installed safely along a system of conduits and wire trays that run between the wheelhouse, on-board labs and the deck. In addition, portable research equipment can be easily replaced and secured from a pattern of flush stainless steel inserts on the aft deck. The vessel's top speed of 22 knots also adds to its cost-effectiveness because researchers can travel a reasonable distance and still return within a normal work day. Operating at an 18-knot cruising speed, the twin Caterpillar 3406E diesel engines, each rates at 700 bhp, burn about 50 gph, yielding a range of more than 600 miles. Two Hal & Staveart five-bladed nickel-bronze propellers are turned by ZF 350A reverse-reduction gears in 8-in. propeller tunnels to reduct draft. A Northern Lights generator provides power and a transducer-well extends above the waterline so they can be changed without hauling the boat out of the water.

Under the raised foredeck are the electronics lab and a wet lab, bunks, galley and settee, as well as a head for six scientists and the crew. The wheelhouse includes the Furuno NavNet system displays charts, GPS, radar and depth at mulitple stations throughout the boat.

Australia

Speed to Spare

The Australian marine industry is noted for building large, fast, efficient vessels, primarily for commercial ferry purposes. But as coastal patrol needs grow, so too do the military applications for these amazing breeds. Following is a brief review of some of the recent news from Down Under.

INCAT

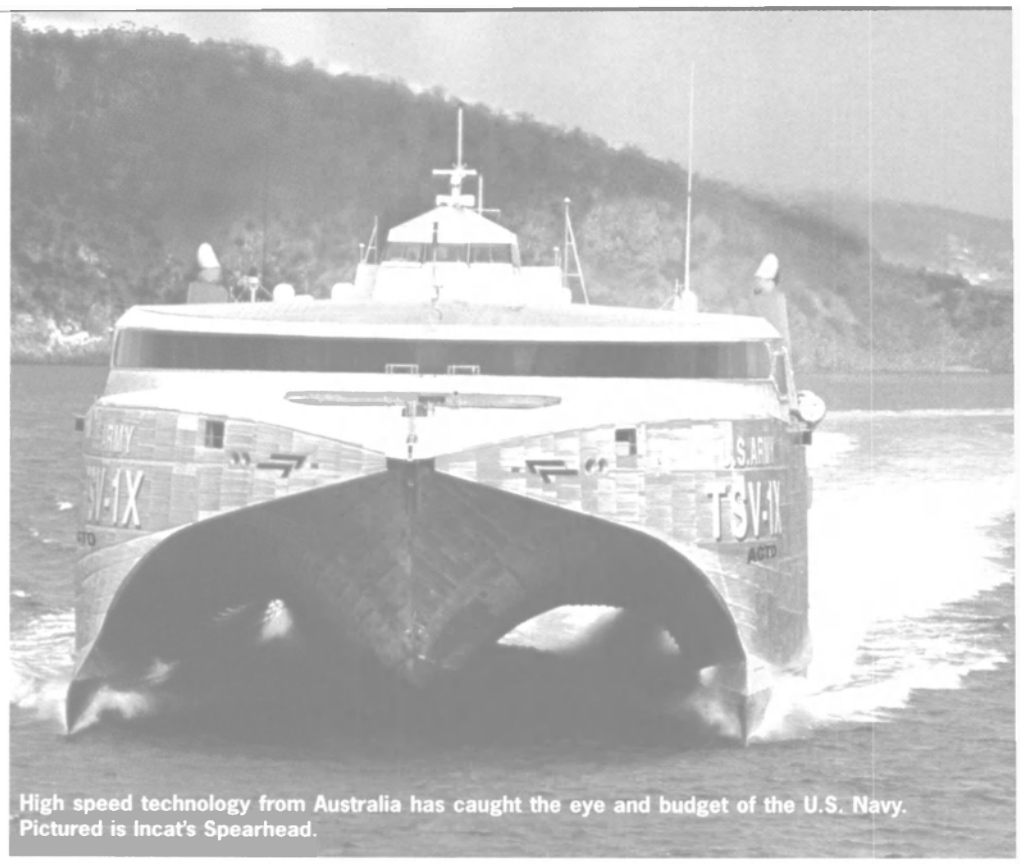
Hobart-based shipbuilder Incat is emerging from a challenging year with news of not one, but two orders for the United States military. Just three weeks after the U.S. Army Tank-Automotive and Armaments Command (TACOM) announced the lease of their first Theater Support for the Army from Bollinger/Incat USA. Military Sealift Command (MSC), Washington, D.C., also announced a contract for a 322-ft. (98-m) craft from Bollinger/Incat USA, to support U.S. Navy Mine Warfare Command.

From its inception, Incat has constructed more than 50 vessels of varying lengths. The company's first passenger/vehicle ferry was delivered in 1990, a 243-ft. (74-m) Wave Piercing Catamaran with a maximum deadweight capacity of 200 tons. The more recent 98 m Evolution 10B range has a dwt four times that amount.

Incat's shipbuilding activity is conducted from a modern facility with more than 32,000 sq. m. under cover, located at Hobart's Prince of Wales Bay. Recently an additional 17,420 sq. m. under cover building hall was commissioned. The new Wilson's dry dock facility has already played host to Joint Venture (hull 050), Condor 10 (hull 030), Winner (hull 045) and The Lynx (057), all of which returned to Incat to undergo dry-docking and refit.

From a military perspective, the Incat built HMAS Jervis Bay (hull 045), commissioned into the Royal Australian Navy in May 1999 for two years to operate between Darwin and East Timor, highlighted to the world how high-speed, light, multihull craft can be utilized for military purposes.

In 2001 and in response to interest from U.S. forces in high-speed craft Incat, via its United States affiliate Incat USA, formed a strategic alliance with an American Shipyard to market and build for the U.S. military and commercial markets. Impressed with what they saw in HMAS Jervis Bay, the U.S. Military followed suit with Incat's 315-ft. (96-m) Wave Piercing Sealift Catamaran HSV-X1 Joint Venture (hull 050).



High speed technology from Australia has caught the eye and budget of the U.S. Navy. Pictured is Incat's Spearhead.

Speaking of Joint Venture's performance in a sealift role, U.S. Navy Admiral **Robert Natter**, Commander-in-Chief of the Atlantic Fleet, said recent fleet exercises had revealed the craft's military potential. "I think there are all kinds of applications for this kind of a high-speed, relatively small craft," he said.

In addition to sealift, Admiral Natter believes the catamarans could be used for inserting special operations forces along coastal waters, as well as to perform surveillance and command and control missions. He also singled out the vessel's potential for mine warfare.

"I'm convinced, based on our experi-

International Catamaran Designs

Incat Design Leaves Indelible Mark

International Catamaran Designs (Sydney) (Incat Designs) are marine designers specializing in fast catamarans. The company, whose designs are licensed for construction by two of the pre-eminent builders of fast ferries in the U.S. — Gladding Hearn and Nichols Brothers Boatbuilders — boasts an impressive client list who operate some of the more efficient and reliable vessels of this genre in the world. Nichols Bros. and Gladding Hearn have each built close to 30 catamarans, and the company's designs are also built in Australia, New Zealand, Singapore, United Kingdom, Hong Kong, Japan, Canada and Iran. In 25 years, more than 160 catamarans had been built to their designs, ranging in size from eight to 122 m. The late 1990s, particularly, proved to be a successful period for the company in the U.S., a market that saw more vessels built than any other market.


SeaStreak New Jersey **was built by Gladding-Hearn Shipbuilding.**

Incat Designs Sydney is perhaps best known for its innovative Wave Piercing Catamaran. Other developments in hull form have been in the development of the Z-Bow catamaran and recent developments have concentrated on designs of high speed low wash vessels for use in harbors and rivers.

Incat Designs Sydney has a large range of designs covering many sizes, hull configurations and vessel uses, and includes:

- Lengths from 11 to over 122 m.
- Catamarans, Wave Piercing Catamarans, Z-Bow Catamarans, Low Wash Hulls, Shallow Draft Hulls and Kitset Packages
- Varying Applications - Passenger Services, Tourist Services, Fast Car Ferries, Cruise Ships, Patrol Boats, Search and Rescue Craft, Airport Rescue Craft, Fast Freighters, Pleasure Craft, Oilfield Supply Craft, Underwater Research, etc.

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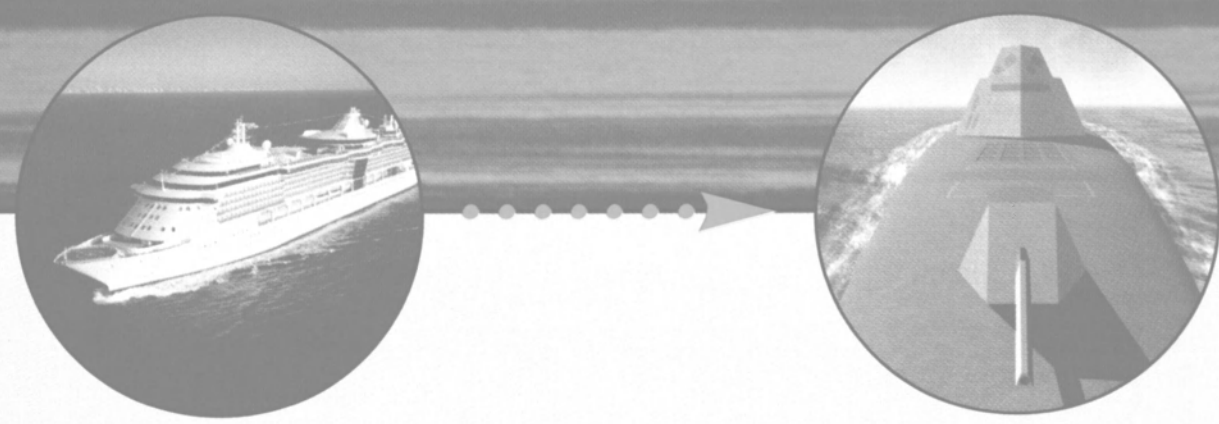
QUITE POSSIBLY

THE SMOOTHEST TRANSITION OF POWER IN NAVAL HISTORY.



The proven gas turbine, integrated-electric-drive propulsion system.

With over 100,000 hours at sea (and cruising), GE-gas turbine, integrated-electric-drive systems are already a huge success on commercial applications, in addition to their outstanding service in foreign navies. Delivering the perfect balance of power for both propulsion and ship services, the compact and efficient gas turbine design lets three or four engines do the work of six, saving both space and capital. To see how smooth a transition to integrated-electric drive systems can be, call 513-552-2347 or go to www.geae.com.

GE Marine Engines

www.geae.com

ments thus far, that with a little different approach to dedicated mine warfare, that something like a high-speed vessel — and I don't care whether it's the HSV that we are leasing or something like that - is the answer," Admiral Natter said. "I can make it work. Somebody's got to let me buy this thing."

Spearhead

Spearhead is the U.S. Army's first Theater Support Vessel (TSV) and is part of the Advanced Concept Technology Demonstrator (ACTD) program by the Office of the Secretary of Defense and the U.S. Army. The vessel will be used to demonstrate and evaluate its ability to perform during certain mission scenarios, assess its usefulness to the U.S. military and refine the requirements for the next generation of army watercraft. The TSV is critical to the Army's ability to perform its Title 10, intra-theater mission. Spearhead will be utilized on missions to maximize its speed and flexibility and is needed for both sustainment deliveries and the movement of Army prepositioned stocks, and troop units.

TSVs promise to change the way the U.S. Army gets to the fight. They will allow the Army to quickly deliver intact packages of combat-ready soldiers and leaders with their equipment and supplies, enabling them to "fight off the ramp" if necessary. Delivering intact units within a theater also will reduce the need for a large-scale on-shore reception, staging, onward movement and integration of soldiers, vehicles and equipment within the battle space. Just three weeks after the awarding of the contract for Spearhead came another, separate, order from the U.S. military. Military Sealift Command, Washington, D.C., is the contracting arm that will lease a 98 m craft from Bollinger/Incat USA, LLC, Lockport, La., to support U.S. Navy Mine Warfare Command. The craft, HSV-X2 (hull 061) is currently under construction at the Hobart, Tasmania shipyard with delivery to Ingleside, Texas scheduled for June, 2003.

Incat's US Military Project Manager **Nick Wells** comments: "Once commissioned, the vessel is expected to serve as an interim replacement for the U.S. Navy Mine Countermeasure support ship Inchon. The craft will also serve as a platform to conduct a series of limited objective experiments, exercises, demonstrations and training events determined by the Navy Warfare Development Command and the Marine Corps Combat Development Command."

The ship will be capable of maintaining an average speed of 35 knots or greater, loaded with 500 short tons, consisting of 350 personnel and military equipment. A minimum operating range of 1,100 n.m. at 35 knots, is required by the contract, as is a minimum transit range of 4,000 nautical miles at an average speed of 20 knots. Furthermore, she must be capable of 24-hour operations at slow speeds (3-10 knots) for small boat and helicopter operations. Development work on the exciting 367-ft. (112-m) Evolution one 12 RoPax catamaran continues. Boasting an operating dwt of 1,000 tons, the Evolution one12 will operate at speeds of 40 knots, or 45 knots with 500 tons dwt. An additional bonus to operators is the ability to increase deadweight to 1,500 tons in which state the craft will operate with cargo at medium speed of approximately 23 knots.

The vehicle deck provides 589 truck lane meters plus 50 cars, or 312 cars in a full tourist mode. With extra optional mezzanine decks fitted the possibility for even greater car capacity exists. Increased vehicle deck headroom of 6.3 m at the center lanes and 5.9 m outboard, under the raised mezzanine decks, will allow the stowage of double stacked containers or MAFI trailers. With a beam of 99 ft. (30.2 m), heavy road vehicles such as B-Double trucks and semi-trailers can easily turn in the bow for quick disembarkation over stern ramps. The innovative passenger cabin layout for up to 1,000 persons with panoramic window layout further improves the traveling experience.

The wide beam also serves to increase passenger comfort by reducing transverse accelerations in the main cabin area. Combined with a new wider trim tab configuration, these will minimize the time the active forward T-foil is required, bringing further fuel and maintenance economies to the operator. The Evolution one 12 is the optimum high-speed RoPax for today's demanding requirements.

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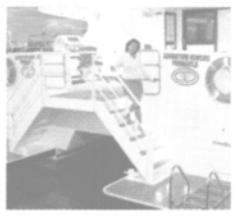
Crowther

Snares Contract for 120-ft. Whale Watcher



Crowther Design are designing a 120-ft. (37-m) High Speed Passenger Ferry for construction at Blount Barker Shipyards, Rhode Island. The operator, B.B.O. LLC., will run the vessel as a whale watcher out of Bar Harbor, Maine. The vessel is designed for 38 knots, powering is via 4 x Cummins KTA50 engines (4 x 1,800 hp) and 4 x Hamilton HM651 waterjets. Delivery is July 2003. Passenger capacities are 288 internal and 146 external, the vessel will be crewed by 10. Layout is designed with large viewing platforms for excellent passenger vision, Sea State ride control is fitted for comfort. Survey will be under U.S. Coast Guard Subchapter K.

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Liferaft Systems Australia

LSA Enjoys Strong Orderbook

Liferaft Systems Australia (LSA) recently won many contracts to supply locally designed and manufactured Marine Evacuation Systems (MES) worth approximately $3 million. Orders have been received for Marine Evacuation Systems (MES) from Derecktor Shipyards in New York, Rodriquez Cantiere Navali in Italy, Australian shipbuilders Incat Tasmania (2 vessels) and Austal Ships (1 vessel) in Western Australia which demonstrates a strengthening in the market. The initial Derecktor order consists of MES and large capacity liferafts was for the Alaskan Government ferry operator Alaska Marine Highway System, with the potential for more orders. The contract is the first received from an American shipbuilder and the first LSA equipment to be manufactured to U.S. Coast Guard approval. "Orders received from Incat Tasmania for MES to be installed on two vessels that are to operate for the USA military will also strengthen the presence of our product in the USA, with no less than three military

vessels operating with LSA MES installed" said Mr Grainger. Incat's first vessel 'Joint Venture HSV - XI' has created enormous interest for LSA, having circumnavigated the world as a showcase for Incat and associated equipment suppliers. The 'flow on effect' is already being experienced, with a steady stream of enquiries from various military applications filtering through to the LSA Hobart and European offices. In addition to the Derecktor and Incat orders, LSA have also secured an order to supply MES to Western Australia shipbuilder Austal Ships. The high-speed vessel will provide a new service route between Rochester and Toronto across Lake Ontario, connecting the United States and Canada. This will see the total number of U.S. ferries with LSA MES installed increase to seven. The order from Italian shipbuilder Rodriquez is the fifth order for LSA equipment installed on their high-speed monohull designed vessels and consists of four MES and five liferafts for delivery in March 2003.

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Austal Ships

Austal Takes In New Vehicle Ferry Business

Austal Ships won a contract for a 217 ft. (66-m) high speed vehicle-passenger catamaran for a well-established ferry operator, bringing to 16 the total number of vessels under construction for the Austal group. "We are particularly pleased by this order as it is from a new customer and reinforces the fact that Austal continues to provide cost effective, tailored solutions for transportation requirements," said Austal's Managing Director, **Bob McKinnon**. "The new vessel will be joining an existing fleet of ferries and we anticipate that its success will lead to more orders from this client in the future."

Due for delivery in August 2003, Auto Express 66 is a 31-knot, 450-passenger, 69-car ferry with the capacity to configure for 110 lane maters of truck plus 37 cars. In addition to this order, Austal Ships also has an 86-m vehicle-passenger catamaran ferry available for delivery in June/July 2003, a 42-knot (fully loaded) vessel with capacity for 774 passengers and 238 cars, or 10 trucks and fewer cars. In addition to the 66 and 86 m vehicle ferries, Austal Ships is currently building two 69 m cruise yachts for Tahiti. Austal, together with its partner Defense Maritime Services, has recently submitted its final bid for the Royal Australian Navy's SEA 1444 Replacement Patrol Boat project. The preferred tenderer for this project will be announced in the first half of 2003. Austal USA, with the support of Austal Ships in Australia, is also currently pursuing military projects involving large multihulls, as well as having orders for three vessels for commercial operators. Another four catamarans in the 40 m range — two for Norway and two for Hong Kong — are being built by Image Marine.

Auto Express 66	
Length, (o.a.)	217 ft. (66.2 m)
Waterline length (approx)	193 ft (59 m)
Molded beam	59.7 ft. (18.2 m)
Hull depth (molded)	19.4 ft. (5.9 m)
Maximum hull dra	ft8.2 ft. (2.5 m)
Passengers	450
Cars	69 (max)
Heavy vehicles	110 truck lane-m (plus 37 cars)
Main engines	2 x MAN B&W
18VP185 and 12VP185	2 x MAN B&W
Gearboxes	Reintjes
Waterjets	(4) Kamewa
Speed	31 knots

Navy

Kennedy Deal Worth $21M

United Defense Industries, Inc. won a $21.7 million contract for its subsidiary, NORSHIPCO, by the Supervisor of Shipbuilding and Repair, for the firm fixed-price Extended Selective Restricted Availability (EDSRA) on the Navy's aircraft carrier, USS John F. Kennedy (CV-67). NORSHIPCO previously won a $10- million contract in November for work on the Kennedy. The work is scheduled to begin in January 2003 and be completed by September 2003 at the Naval Station Mayport, Fla. The work package focuses on work in two of the four engine rooms and includes main machinery room repairs consisting of tanks, boilers, forced draft blowers, steam valves, reduction gears, main feed pumps, main condenser, lube oil pumps, piping.

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DDG 88 Commissioned

USS Preble (DDG 88), built by Northrop Grumman's Ship Systems sector, was commissioned on November 9, 2002, in Boston, Mass. Measuring 509.5 ft. (155.1 m), this 9,300-ton ship is named in honor of Commodore **Edward Preble** (1761-1807), who was appointed a first lieutenant in the Navy in 1798. **Connie Rae Clark**, wife of Adm. **Vern Clark**, USN chief of naval operations, served as the ship's sponsor, and U.S. Sen. **Edward Kennedy**, (D-Mass.), delivered the principal commissioning address.

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Navy Christens Chaffee

The newest Arleigh Burke class guided-missile destroyer, the 511-ft. (155.7-m) Chafee was christened on November 11, 2002, during a ceremony at Bath Iron Works, Bath, Maine. The ship honors **John Hubbard Chafee** of Providence, R.I., who distinguished himself as a U.S. senator, Navy secretary, Rhode Island governor, and a Marine — with service as both an enlist-

Aircraft Carrier of the Future

8 Minutes ...

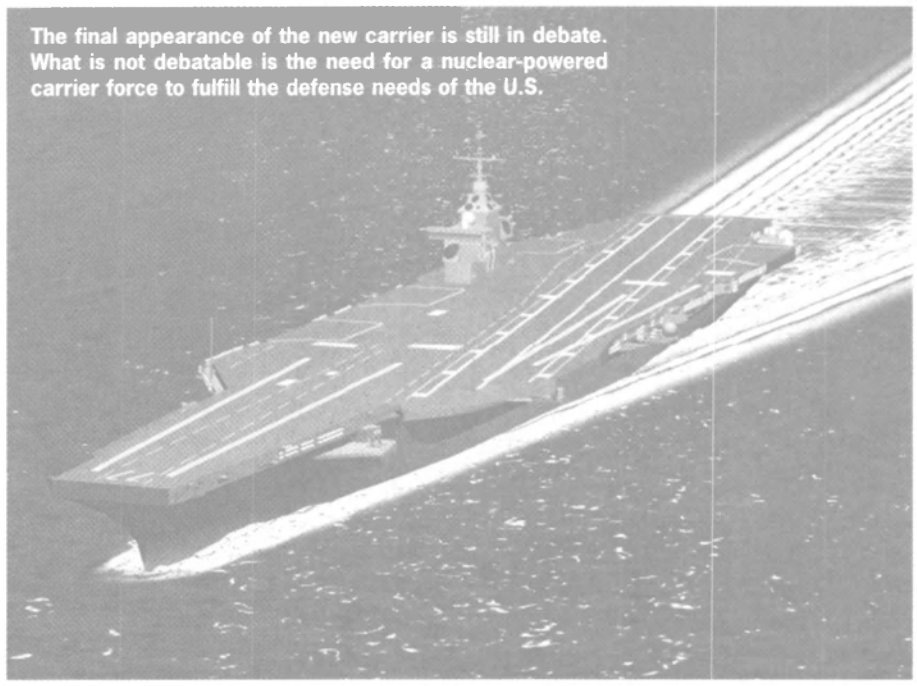
Pause for eight minutes, and experience how long it feels. Now imagine that same eight minutes spent pinned down by someone trying to kill you. The next-generation of aircraft carrier must fulfill old and new roles alike. The question now: what will it look like, and how much will it cost?

Strategic air superiority is invaluable in every single future war scenario, crucial to hitting land-based targets and field troop support. Army planners reckon that eight minutes is the maximum amount of time from initial target call to weapons on target.

As the U.S. Navy literally reinvents itself over the next decade, questions turn to the role of the premier symbol of U.S. power and foreign policy — the nuclear powered aircraft carrier — referred to "90,000 tons of diplomacy" by its Newport News, Va.-based builder. A recent report from the Defense Science Board Task Force dubbed "Future of the Aircraft Carrier" helps shed some light. The creation of the modern aircraft carrier is nothing short of a production miracle. It takes about seven years, almost 50,000 tons of precision-welded steel, a billion parts from 3,000 suppliers and hundreds of miles of wire and cable to build what is easily the most formidable and dominating war machine afloat. Special bonuses: No two are exactly alike; each is designed to dominate the seas for 50 years, stopping for refueling just once in its lifetime.

There is little doubt as to a nuclear aircraft carrier's value, both physically and psychologically. It provides a launching pad for U.S. forces when a land-based alternative is unavailable, and undoubtedly has played a major role in directing any number of delicate negotiations.

But as the U.S. Navy focuses more on the gathering, dissemination and incorporation of information, with more intent focus on smaller, faster craft to carry out a number of new initiatives that better reflect today's political and military environment, questions ranging from the need for to the look and role of next-generation carriers has been loudly debated. Seen largely as a tool of the Cold War, the recent report from the Defense Science Board noted that "the current sea-based air system design is 40 years old and has little margin for inserting new capabilities," noting it possesses limited weight, stability and electrical power margins. Concurrently, the report reasons that air superiority is critical to all future battles in which the U.S. may engage, and aircraft carriers provide decisive air-strike capabilities.



The final appearance of the new carrier is still in debate. What is not debatable is the need for a nuclear-powered carrier force to fulfill the defense needs of the U.S.

Questions currently revolve on the next generation, dubbed CVNX. Already delayed one year due to review, the Defense Board terms the construction of CVNX-1 as "a crucial step in reducing carrier operating costs," and that the ship be built as planned, but concludes that it is simply the only near-term option available to the U.S. Navy.

Specifically, the Task Force recommends that today it is necessary to kick-start a plan to "aggressively pursue new sea-based air system concepts to keep ahead of missions and threats," saying that "carrier designs CVNX-2 and beyond should not be a foregone conclusion." In short, there are serious doubts about the current Nimitz class or the new design to work quickly and safely in the Littoral, which is paramount to the new Navy. Aside from the physical and technological ship shape, the Task Force recommends the establishment of a Carrier Technology Oversight Council (CARTOC) modeled after the submarine equivalent, SUBTOC, and that increasing attentioned be paid to the way in which the new breed of carriers are funded. Acronyms aside, the key to the final product was laid in the mass of corporate consolidations which led Northrop Grumman to buy Newport News Shipbuilding enroute to an estimated $26 billion in acquisitions. Northrop Grumman not only builds the ships, it supplies many of the aircraft and electronics, allowing for an unprecedented level of cooperation among designers at an early stage. Today, the Navy prepares to take delivery of USS Ronald Reagan (CVN 76) in 2003, and has just started construction on the newly named USS George H.W. Bush (CVN 77), named after the 41st President and the last of the class. The ship is expected to join the fleet in 2009.

Aircraft Carriers Built at Northrop Grumman Newport News Shipbuilding

Name	Launched	Commiss.	Length o.a.	Beam	Depth	Displ.
RANGER (CV4)	02-25-33	6-04-34	769'0"	80'0"	51'0"	15.758
YORKTOWN (CV5)	04-04-36	09-30-37	824'9"	82'3"	52'6"	23,547
ENTERPRISE (CV6)	10-03-36	05-12-38	824'9"	82'3"	52'6"	23,547
HORNET (CV8)	12-14-40	10-20-41	824'9"	82'3"	52'6"	23,297
ESSEX (CV9)	07-31-42	12-31-42	856'0"	93'0"	54'6"	33,292
YORKTOWN (CV10)	01-21-43	'04-15-43	856'0"	93'0"	54'6"	33,292
INTREPID (CV11)	04-26-43	'08-16-43	856'0"	93'0"	54'6"	33,292
HORNET (CV12)	08-30-43	11-29-43	856'0"	93'0"	54'6"	33,292
FRANKLIN (CV13)	10-14-43	01-31-44	856'0"	93'0"	54'6"	33,292
TICONDEROGA (CV14)	02-07-44	05-08-44	888'0"	93'0"	54'6"	33,292
RANDOLPH (CV15)	06-28-44	10-09-44	888'0"	93'0	54'6"	33,292
BOXER (CV21)	12-14-44	04-16-45	888'0"	93'0"	54'6"	33,292
MIDWAY (CV41)	03-20-45	09-10-45	968'0"	113'0"	57'6"	56,957
CORAL SEA (CV43)	04-02-46	10-01-47	968'0"	113'0"	57'6"	56,957
LEYTE (CV32)	08-23-45	04-11-46	888'0"	93'0"	54'6"	33,292
FORRESTAL (CV59)	12-11-54	10-01-55	1,039 0'	129 4"	60'10"	75,900
RANGER (CV61)	09-29-56	08-10-57	1,046'0"	129'4"	60'10"	75,900
ENTERPRISE (CVN65)	09-24-60	11-25-61	1,101'2"	133'0"	63'0"	86,818
AMERICA (CV66)	02-01-64	01-23-65	1,047'6"	129 4"	60 10"	79,166
JOHN F. KENNEDY (CV67)	'05-27-67	09-07-68	1,040'0"	128'6"	60 10"	81,119
NIMITZ (CVN68)	05-13-72	05-03-75	1,092'0"	134'0"	100'6"	90,702
DWIGHT D. EISENHOWER (CVN69)	10-11-75	10-18-77	1,092'0"	134'0"	100'6'	91,258
CARL VINSON (CVN70)	03-15-80	03-13-82	1,092'0"	134'0"	100'6'	91,496
THEODORE ROOSEVELT (CVN71)	10-27-84	10-25-86	1,092'0"	134'0"	100'6'	91,209
ABRAHAM LINCOLN (CVN72)	'02-13-88 C	11-11-89	1,092'0"	134'0"	100'6'	91,209
GEORGE WASHINGTON (CVN73)	07-21-90 C	07-04-92	1,092'0"	134'0"	100 6'	91,209
JOHN C. STENNIS (CVN74)	11-11-93 C	2-09-95	1,092'0"	134'0"	100'6'	91,209
HARRY S. TRUMAN (CVN75)	09-07-96 C	07-25-98	1,092 0"	134'0"	100'6'	91,209
RONALD REAGAN (CVN76)	—	—	1,092'0"	134'0"	100'6'	91,209

C = Christening Date Source: www.nns.com

Future Carrier Technology

The Defense Science Board Task Force — via its published report *Future of the Aircraft Carrier* — weighed in on the following tech matters for the new carrier fleet:

Nimitz Design
"The Nimitz design is dated."

Propulsion
"Nuclear power is worth the extra investment."

Electrification
"...will simplify ship systems and increase mission flexibility. Initial costs will be worth the investment..."

Utliization
"The Navy has sub-optimized the carrier deployment cycle, a misuse of an expensive resource."

Crew Size
"The Navy can significantly reduce crew size to lower carrier lifetime costs ..."

Cummins Introduces the QSK60

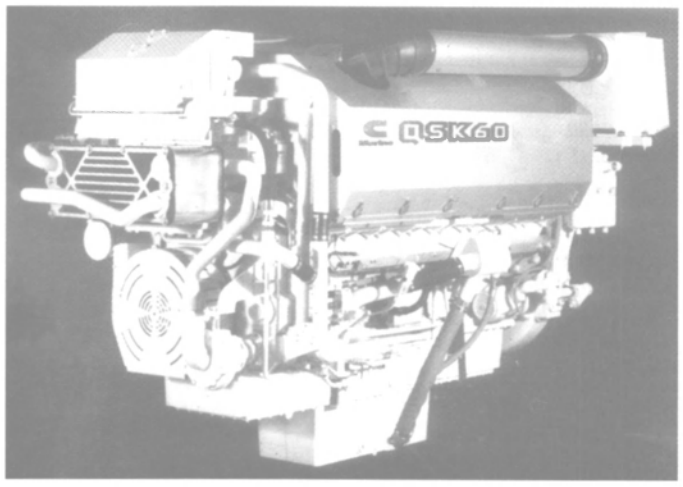
Cummins literally unveiled its QSK60 powerplant to the marine market at the Workboat Show in New Orleans, ushering in a new, more powerful age for the surging diesel engine manufacturer. "This engine will take Cummins into new markets," said **Geoff Conrad**, general manager, Cummins Marine. "But it is meant for the Workboat market ... it's meant to last a very long time."

The new engine (new for the marine market, that is) has a power range of 2,000 to 2,300 hp (1,492 to 1,716 kW for propulsion and 1,500 to 1,825 kW for auxiliary applications, and is now the most powerful in the Cummins line-up. "The QSK60 provides operators a new choice as well as a cost effective alternative to medium speed," Conrad said. "Additionally, the engine has an established track record in demanding mining, excavator and electrical power applications, with thousands of units in service."

The QSK60 is manufactured at the Daventry Engine Plant in the U.K., the same facility that builds the K38 and K50 engines. To date, the facility has manufactured more than 2,000 QSK engines for both industrial and land-based power generation operations.

The Engine

The QSK60 is emissions compliant to IMO Annex VI of MARPOL 73/78 and certified by the EPA, Lloyd's Register and CCNR. Cummins expects the QSK60 to receive certificates from ABS, DNV, LR, BV, and GL in time for the first full production engines to ship in June 2003. The robust engine block is designed for continuous duty operation and long life. Metric O-ring seals and edge molded gaskets eliminate fluid leaks. Full power take-off available from front of crankshaft. Ductile single-piece piston design with hardened liners and nitride coated rings for durability. The engine can be cooled either via a keel cooler or via engine mounted plate-type heat exchanger. The fuel system is full authority Quantum electronic for optimized combustion and enhanced fuel economy. In the lubrication system, the Cummins Eliminator — which



replaces disposable filters and helps extend oil drain intervals) and Centinel Oil Management System are designed to provide extended service intervals and less maintenance.

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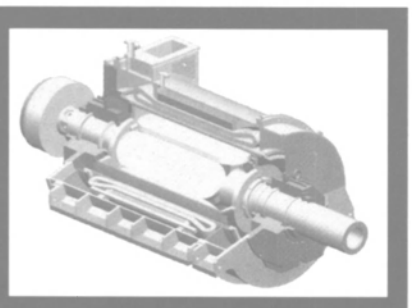
Cummins QSK60 Engine Specs

Configuration	V-16 cyl., 4-stroke
Bore	159 mm
Stroke	190 mm
Displacement	60.2 l
Rotation	Counterclockwise facing flywheel
Compression ratio	14.5:1
Length	3,399 mm
Width	1,648 mm
Height	2,095 mm
Weight (KC)	18,209 lb.
(HX)	19,049 lb.

Performance Information

	Continuous Duty	Continuous Duty	Heavy Duty
RPM	1,800	1,800	1,900
kW (bhp)	1,492 (2,000 bhp)	1,641 (2,200 bhp)	1,716 kW (2,300 bhp)
Max torque rating	2,000 hp	2,200 hp	2,300 hp
(N-m)	8,364	8,364	9,053
(ft.-lb.)	6,169	6,169	6,677
RPM	1,500	1,500	1,500
lb./hp-hr	.341	.341	.342
gal/hr.	97.4	107.2	112.4

AMSC Passes Milestone



American Superconductor Corporation (AMSC) completed the manufacture and testing of the rotor assembly for what they dub the world's first high temperature superconductor (HTS) ship propulsion motor. AMSC, which is manufacturing the prototype motor under a contract from the U.S. Navy's Office of Naval Research (ONR), shipped the rotor assembly to Alstom's Power Conversion Business in the U.K. Alstom is contracted by AMSC to build the stator and to take care of the final assembly including factory testing of the complete motor by July 2003, at which time the finished motor will begin testing by the Navy. The power rating of the high torque, low speed (230 rpm) HTS motor is 5 MW, or 6,500 shp. The rotor assembly, which is the heart of the motor, includes the rotor shaft, torque tube, HTS coils — wound with AMSC's HTS wire — a power electronic exciter, and integrated refrigeration components used to cool the HTS coils. The 5 MW/230-rpm HTS motor will be one-half the size and weight of a conventional motor built with copper coils. The electrical losses of this motor will be less than half those of a conventional ship propulsion motor because of the higher electrical efficiency provided by the HTS wires employed. The low-speed, high-torque 5 MW motor is the power rating required to propel many types of passenger and merchant vessels including container ships, passenger ferries, RoRo merchant cargo ships and tankers. **Dave Paratore,** vice president and general manager of American Superconductor's Electric Motors and Generators business unit, said that the next key steps in the development of military and commercial HTS ship propulsion motors will be the demonstration of a 25 MW/120-rpm motor. "While our 5 MW motor is already a commercially viable size, we also intend it to be a risk mitigation step toward the development of HTS motors with power ratings up to about 40 MW, which we intend to have as part of our product portfolio along with HTS generators that will supply the electricity to run the motors."

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Emission-Reduction Test a Success

New emission reduction technology was recently proven in a joint test with Holland America and RINA. The test was conducted aboard Veendam. Pictured is sistership Zaandam.

Reduced emissions from diesel engines at sea has become a rallying cry from legislators to ship owners to diesel engine manufacturers to fuel and additive suppliers. Last month a significant milestone in the fight to reduce emissions was achieved, as emission-reduction technology reportedly been tested successfully on Carnival's Holland America (HAL) ship, Veendam.

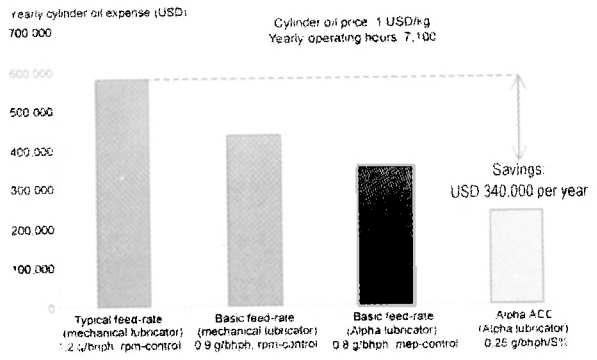
The tests were carried out jointly by Carnival Corporate Shipbuilding, HAL and RINA within a common R&D project. The technology is based on injecting water into fuel to create micro-droplets of emulsified fuel. Two pilot units were built and retrofitted on board Veendam. They were tested in accordance with an on board testing protocol developed by RINA. **Mario Dogliani,** Innovation & Research Manager of RINA, the Italian classification society, said the results of the weeklong tests were extremely successful. "There was significant reduction of visible smoke and emissions from the diesel engines as well as a decrease in fuel consumption. Sludge oil was also efficiently burned in the boiler, reducing emissions and without producing visible smoke," he said.

According to **Jim Drager**, Carnival Corporation's vice president of Corporate Shipbuilding, "The undertaking of this technology development is a further demonstration of Carnival's commitment to working with companies to develop new technology aimed at protecting the environment."

This micro-emulsion technology has been patented in the European Union nations, U.S. and Japan by Ing. **Ernesto Marelli,** CEO and owner of Mec System, an Italian company and partner in the R&D project. It was initially developed to produce micro-emulsified fuels for land-based thermal plants and for public bus transportation. The transfer of this technology to the maritime field was undertaken by Mec System, Cadel Srl, RINA and Carnival Corporate Shipbuilding. The same pilot unit is being tested by Wartsila in its land-based Vaasa laboratory as part of the SAFENVSHIP R&D project. Additional testing and evaluation will continue and Carnival Corporation will equip several ships in its other operating companies with pilot units for additional testing. The SAFENVSHIP European R&D project was started in April 2002, with a budget of approximately $15 million. This project's purpose is to identify shore-based technologies which can be transferred to cruise ships and ferries.

MAN B&W Confirms Savings

Highly promising results in terms of cylinder oil savings, lower particle emissions and reduced combustion chamber wear figures are emerging from testing of a wide range of MAN B &W MC/MC-C two-stroke engine equipped with Alpha Adaptive Cylinder oil Control (Alpha ACC), according to the diesel engine manufacturer.



The aim of the test was to confirm the savings of cylinder oil consumption delivered by the electronically controlled Alpha Lubricator System, savings that help reduce operating costs and environmental impact, with the added benefit of reduced cylinder liner wear rates. Large bore engines for both container ship (K-MC/MC-C) and the VLCC (S-MC/MC-C) propulsion are covered in the current program, along with small and medium bore MC/MC-C engines. Alpha ACC allows the cylinder oil dosage (g/bhph) to be controlled in such a way that it is proportional to the amount of sulphur (g/bhph) entering the cylinder with the fuel. Results from a 12K90MC engine powering a 6,800 teu containership illustrate the economic value. Significant savings in daily cylinder oil consumption though Alpha ACC of the 12K90MC engine, monitored over a five-month period, equate to an annual savings of $340,000 on cylinder oil.

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New Twin Prop for River Cruisers

Schottel has unveiled a new twin propeller arrangement designed to specifically fulfill the needs of river cruise ships. Two units — type STP 550 — appears onboard the A'Rosa Bella, the first of four 410-ft. (125-m) luxury cabin-class vessels built for Seetours Shipping. A'Rosa Bella - built in Germany at Neptun Rearaturwerft GmbH in Rostock Warnemünde, was delivered in the Spring 2002. The company soon after developed the STP 440 for use on shorter cabin-class vessels. The new solution — initially developed for sea-going ships — was designed and tailored to optimize efficiency, minimize noise and enable operation in shallow waters.

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MTU Opens Training Center

MTU Friedrichshafen opened its new training center, a center to be used for training MTU's own customer service mechanics, professional service staff of the company's 1,400 sales and service partners worldwide, and representatives and end customers.

"Service is an operative business," said Dr. **Rolf A. Hanssen,** MTU CEO. "Our end customers demand the highest possible availability of their drive systems and installations. The better geared we are to this, the greater are our competitive chances." The new training center has 14 instructors responsible for the training and supervision of service mechanics and who give them the required technical maintenance skills for the company's engines and drive systems. It is equipped for intensive training in small groups in five languages and up to 90 participants at any given time, and has the capacity to train more than 2,000 service employees each year.

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Fortum Selects Schilling Marine Rudders

For a pair of new 14,000-dwt chemical carriers Fortum Oil & Gas selected Hamworthy KSE's Schilling Mariner high-lift rudders. The ships are being built by ENVC of Portugal. The rudders, scheduled for delivery this month, are designed to provide the necessary maneuverability and durability demanded by the DNM Ice Class 1A* vessels.

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Bollinger to USCG: 50 Boats and Counting

Marine Protector Class, USCG Cutter Pelican during patrol in the central Gulf of Mexico, operating from its home port of Vermillion, La.

What first began in 1996 as a contract from the U.S. Coast Guard to Bollinger Shipyards to construct one 87-ft. (26.5-m) Marine Protector Class Coastal Patrol Boat (CPB) with options, has since led to the delivery of 50 of these same vessels — all of which are named after marine protected species. The shipyard delivered the USCG Petrel — the last of the 50 vessels - on September 4.

Resulting from increased homeland security measures and other mission requirements, the USCG has received authorization for Bollinger to build up to 13 additional CPB's. With funding already secured, the construction of the 51st vessel will commence during the fourth quarter of 2002, with delivery planned in September 2003, with additional vessels following at one month intervals.

These Marine Protector Class boats are multi-mission platforms capable of performing Search and Rescue (SAR), Law Enforcement (LE), and Fisheries Patrols, as well as drug interdiction and illegal alien interdiction duties up to 200 miles offshore.

Based on the Damen STAN 2600 design developed for the Hong Kong police, Bollinger modified the design to meet USCG requirements, such as a maximum continuous speed of 25 knots; Patrol speed not less than 10 knots; maneuvering speed not greater than four knots with one engine continuously engaged; and Berthing for a mix of male/female crew members of 10 plus a spare berth.

Measuring 87 ft. (26.5 m), with a width of 19 ft. (5.9 m) and a maximum draft of 6 ft. (1.7 m), the vessels are armed with two 50 caliber machine guns as well as small arms, and can carry approximately 2,900 gallons of fuel and 400 gallons of potable water.

Power is provided via a pair of MTU 8V 396 TE94 diesel engines developing 1,500 hp drive five-blade propellers on each of the boats through ZF BW 255 reverse/reduction gears.

New Barge Pump Package Solutions

In New Orleans last month Stewart & Stevenson was displaying its DDC Series 60 and 40 custom barge pump package, which is among the first created specifically to meet USCG standards and the harsh conditions for product pump applications. Among other features, the package offers: emissions compliancey; fuel efficiency; enhanced diagnostic capabilities; and lower overall life-cycle costs. In addition to the new package, the company is touting new financing options for new equipment purchases and re-power packages using these engines.

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Xenex Debuts New Marine Displays

Xenex Navigation Inc. announced the new Xenex Navigence line of high-bright marine displays for radar electronic charting and general marine applications. The Navigence Daylight-Readable (XDR) and Sunlight-Readable (XSR) marine displays are flat-panel, TFT, LCD displays with screens of 12.1-, 15-, and 17-in. respectively. The XDR and XSR series provide mariners a reliable, high-brightness and high-resolution screen image under extreme lighting conditions at a great value. Products such as the Navigence XDR and XSR marine displays are in significant demand in the growing PC-based marine electronics market. "Cost has become an important issue in the purchase of a marine display that meets the rising standard of safe navigation," said **Harvey Russell**, president of Xenex Navigation.

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SwiftCraft Aids in Speed, Power Prediction

The latest designer tool from HydroComp is SwiftCraft, a new tool for speed and power prediction on monohull vessels under 250 ft. (75 m). Swiftcraft has been developed for designers and builders of motor yachts, patrol craft, small ships, supply vessels, ferries and other types of transit craft.

"SwiftCraft was developed using a new interface architecture which builds upon a user's familiarity with navigation on the web," said **Donald MacPherson**, HydroComp's Technical Director. "Usability testing has determined that the new interface model promotes the rapid and proper completion of tasks, which is absolutely critical to reliable speed prediction."

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Westfalia Offers New Technology

Westfalia Separator unveiled its D-Series, its newest separator for marine, power, oilfield and industrial applications. The D-Series are self-cleaning disc type separators used for the continuous treatment of fuel oils, lube oils, hydraulic oils, de-oiling of water and de-oiling and de-watering of sludge. The D-Series models are available with capacities from 410 to 9,855 gph, depending on application.

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Engine Oil Analysis Kit Launched

Jet-Care International and its parent company Spectro Oil Analysis Co. Ltd. introduced a new engine oil analysis kit and service for the marine market Designed for the workboat market, the Spectro Marine Kit contains 20 oil sample bottles with tubing, a pump to extract the oil and all the instructions and labels necessary for the preparation and the mailing of the sample back to either the Jet-Care or Spectro laboratories. On receipt of the oil samples, the following tests are carried out: wear metals, viscosity at 100 degrees C, flash point, fuel content, insolubles, Total Base Number (TBN) and water content. This software provides the ability to trend, graph and view the actual oil analysis results. It is user friendly and flags immediately those systems or engines that require further investigation. Alert levels set using engine manufacturer's specifications and from years of experience, take the guesswork out of troubleshooting.

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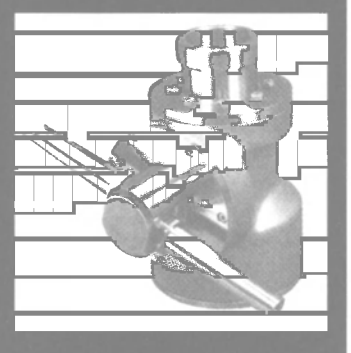
Scanjet's Tank Cleaning System Reduces Vessel Turnaround Time



Based in Norway, Scanjet is a world-leading supplier of tankcleaning-machines (guns) to the marine market with deliveries to VLCC's, product tankers, chemical tankers, drilling rigs and supply vessels. The machines, which cover the tank surface completely by vertical and horizontal rotation of the nozzle, have proven to be - especially in the North Sea - extremely efficient. Traditionally, vessels are equipped with two nozzles machines, which Scanjet has managed to override. The company has developed a new generation of offshore tankcleaning machines with just one nozzle. The machine boasts four different programs (pitch adjustments), which can establish, if needed, a dense track or a coarse/open track, which cleans the tank in approximately three minutes. The drive unit is situated outside the tank, which gives low wear and reduced spare part-consumption. Scanjet's machines are equipped with a unique magnetic (patented) coupling system, which eliminates any leakage between the turbine and the gear/drive unit. This system is especially helpful in the chemical tanker market, since oftentimes problems can occur during cleaning with a cargo that penetrates and coagulates in the gear unit/machinery. Scanjet's magnetic coupling system eliminates this problem completely since the cleaning water (or mud) can be re-circulated without any problem, thereby reducing slop to a minimum. Scanjet also supplies a purpose developed cleaning chemical (Scanjet Rig-Cleaner), which is an effective and often needed tool for achieving a totally clean tank.

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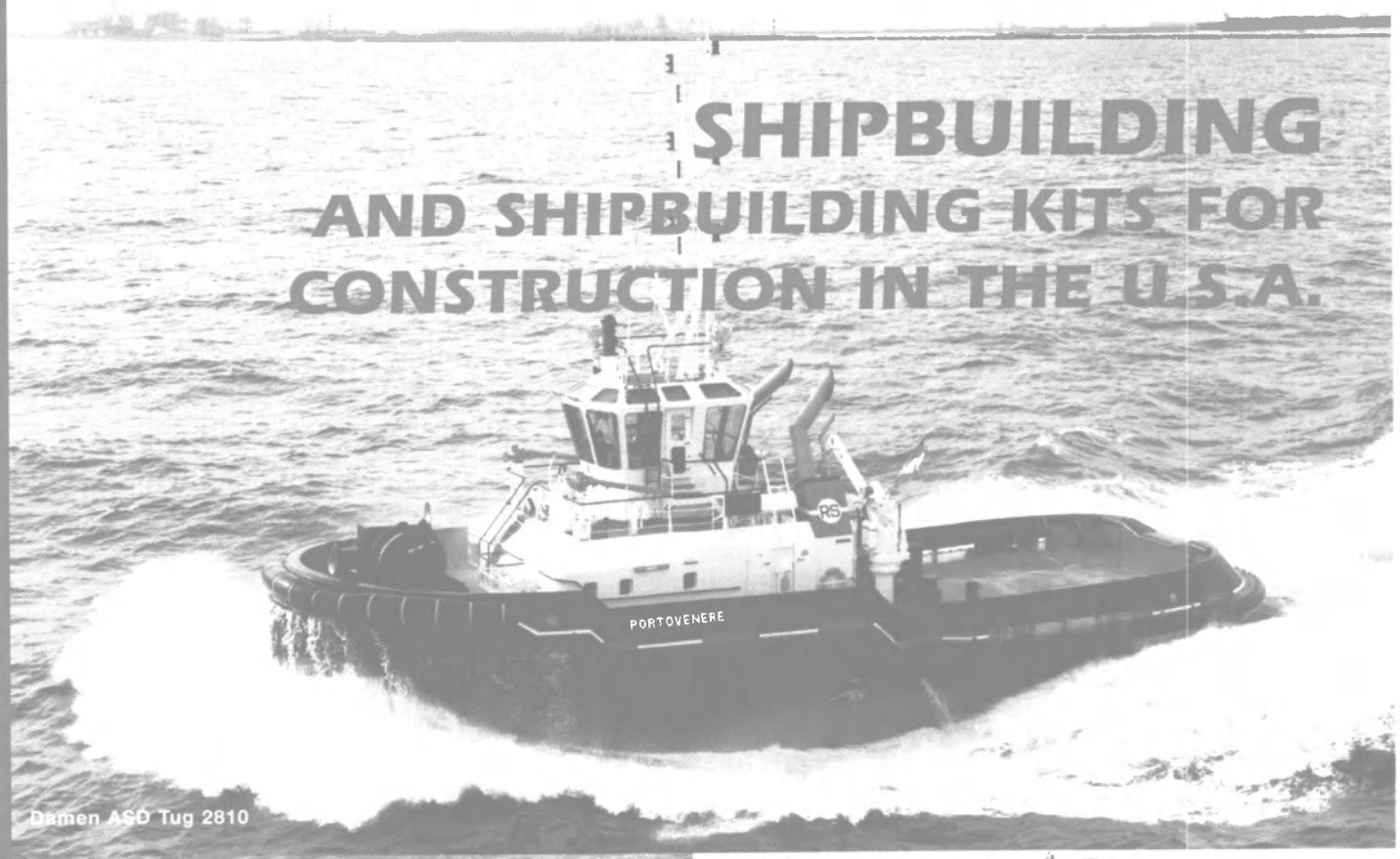
SHIPBUILDING
AND SHIPBUILDING KITS FOR CONSTRUCTION IN THE U.S.A.



Damen ASD Tug 2810


Damen ASD Tug 3111


Damen Stan Tug 2608

Damen Shoalbuster 2509

Damen Stan Tug 2207

DAMEN

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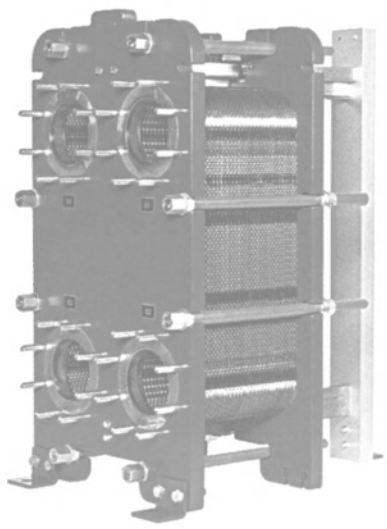
Alfa Laval Offers New Plate Heat Exchanger Steam Heater Line

Alfa Laval introduced a line of plate heat exchangers for steam heating in the marine industries, reportedly the first gasketed plate heat exchangers series designed specifically for use with industrial steam and includes two models suitable in marine duties as jacket water coolers, tank cleaning water heaters and dumping condensers. This new steam heater series extends design temperatures to 350 degrees F and increases design pressures. The two models are the TS6 and TS20M. The smaller model, the TS6, has a capacity of 2 to 18 MW at a steam condensation temperature of 300 degrees F and 2 to 12 MW at a steam condensation temperature of 248 degrees F. The larger model, theTS20M,



extends liquid flowrates up to 3,900 gpm depending on the media, permitted pressure drop and temperature It has a capacity of 2.5 to 15 MW at a steam condensation temperature of 300 degrees F and 2.5 to 9 MW at a steam condensation temperature of 248 degrees F. The new TS-M plate design is optimized for condensing steam in one channel and heating liquid in the alternating channel. The robust construction of this series eliminates thermal fatigue and, as a result of its low hold-up volume, allows rapid temperature control.

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Moose Boats Wins GSA Contract for Boats

Moose Boats won a contract by the GSA (General Services Administration) to provide marine craft and equipment to state and federal government agencies. The GSA schedule contract will make it easier for government agencies to purchase Moose Boats line of new generation all-aluminum catamarans for a variety of applications such as law enforcement, fish & game, naval security, harbor patrol and search & rescue.

"Receiving a Federal Supply Contract award was very important to our strategy moving forward," said **Roger Fleck,** president of Moose Boats. "Our line of functional, good-looking, rugged boats are built for people whose jobs and lives depend on their performance. These are no-nonsense, serious boats."

Moose Boats are all welded aluminum construction.

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Ferlship's New Contracts

Ferlship is a strategic consultancy highly specialized in market researchs guided to the shipping industry. For additional information, please contact Ferlship @: Pza. Sta. Mª Soledad Torres Acosta, 2. 2º 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**
(Prices are in U.S. Dollars) **(NOTE: Contracts are for September, October, November and December 2002)**

Owner	Builder	Type	No.	DWT	Deliv.	Price ($)
PETROBRAS	EISA SHIPYARD	AHTS	1	—	4	—
PACIFIC RICHFIELD	PAN-UNITED SHIPYARD	AHTS	2	—	4-Mar	10
MAERSK SUPPLY SERVICE	VOLKSWERFT STRALSUND	AHTS	2	—	4	—
ANGEUCOUSSIS	DAEWOO	BULK CARRIER	2	170,000	5	72
TROPIS SHIPPING	SAMHO NEW SHIPYARD	BULK CARRIER	2	170,000	4	70
EUROPEAN INTERESTS	TSUNEISHI	BULK CARRIER	1	82,500	5	23
PACIFIC CARRIERS	ISHIKAWAJIMA HARIMA H.I. (IHI)	BULK CARRIER	2	82,000	4	—
DIANA SHIPPING	JIANGNAN	BULK CARRIER	2	74,000	5-Apr	41
COSCO	NANTONG COSCO KHI	BULK CARRIER	6	55,000	4	111
HAYAMA SENPAKU	OSHIMA SHIPBUILDING	BULK CARRIER	1	52,400	4	—
POLISH STEAMSHIP COMPANY (PZM)	XINGANG SHIPYARD	BULK CARRIER	4	38,000	5-Apr	68
CUPPER GROUP	XINGANG SHIPYARD	BULK CARRIER	2	32,500	4-Mar	30
SINCERE NAVIGATION	KANDA SHIPBUILDING CO.	BULK CARRIER	1	32,000	5	—
INTERSHIP NAVIGATION	SAIKI	BULK CARRIER	1	31,350	4	15
LAUTERJUNG,MANFRED	GUANGZHOU	BULK CARRIER	2	27,000	4	30
ARKO ENERGY	DONG FENG	BULK CARRIER	8	15,000	4	50.4
K LINE	IMABARI SHIPBUILDING	BULK CARRIER	2	205,000	5	—
EUROPEAN INTERESTS	SAMHO NEW SHIPYARD	BULK CARRIER	1	170,000	4	—
MITSUI O.S.K. LINES (MOL)	IMABARI SHIPBUILDING	BULK CARRIER	2	88,000	3	—
EUROPEAN INTERESTS	IMABARI SHIPBUILDING	BULK CARRIER	1	76,000	4	—
IRISL	ISOICO	BULK CARRIER	2	76,000	5	—
KOMROWSKI	JIANGNAN	BULK CARRIER	2	74,000	3	40
KC MARITIME	ZHONGHUA SHIPYARD	BULK CARRIER	1	74,000	3	—
TAIWAN NAVIGATION	OSHIMA SHIPBUILDING	BULK CARRIER	2	52,500	5-Jan	36
PACIFIC BASIN BULK SHIPPING	KANDA SHIPBUILDING CO.	BULK CARRIER	1	32,600	4	—
UNKNOWN	SHIKOKU DOCKYARD	BULK CARRIER	1	32,000	4	15.1
FOREMOST	SHANGHAI WAIGAOQIAO	BULK CARRIER	1	175,000	4	—
TEH-HU CARGOCEAN	SHANGHAI WAIGAOQIAO	BULK CARRIER	2	175,000	5	—
JAPANESE INTERESTS	TSUNEISHI	BULK CARRIER	1	76,300	4	—
JAPANESE INTERESTS	IMABARI SHIPBUILDING	BULK CARRIER	5	76,000	5-Apr	—
COSCO	TSUNEISHI	BULK CARRIER	2	76,000	4	—
UNKNOWN	SANOYAS CORP.	BULK CARRIER	3	75,000	4	—
BOCIMAR	HUDONG SHIPYARD	BULK CARRIER	2	74,000	4	42
ANGELAKOS	NAMURA ZOSENSHO	BULK CARRIER	1	73,990	3	—
TSCHUDI & EITZEN	OSHIMA SHIPBUILDING	BULK CARRIER	1	55,200	4	—
SANKO KISEN	MITSUI	BULK CARRIER	2	55,000	5	—
SANKO KISEN	OSHIMA SHIPBUILDING	BULK CARRIER	2	55,000	5	—
SANKO KISEN	TSUNEISHI	BULK CARRIER	2	55,000	5	—
GRAIG SHIP MAN'T	BOHAI SHIPYARD	BULK CARRIER	4	53,000	4	76
LEMITEC	XIAMEN	BULK CARRIER	2	52,000	4	37
COLUMBIA SHIPMANAGEMENT	DALIAN NEW	BULK CARRIER	3	30,000	4	—
IASCO SHIPPING CO.	IMABARI SHIPBUILDING	BULK CARRIER	2	28,200	4	—
SUNSHIP	GUANGZHOU	BULK CARRIER	1	27,000	4	—
TONG YANG C.	INP HEAVY INDUSTRIES	BULK/CEMENT CARRIER	1	6,500	4	—
CIDO SHIPPING	SHIN KOCHI JUKO	BULK/Log CARRIER	2	28,300	4	28
OCHI	IWAGI	BULK/Ore CARRIER	1	53,000	3	—
NISSEN KAIUN KKK	MITSUI	BULK CARRIER ORE STRENGTHENED	2	177,000	4	71
TRASMED	HYUNDAI HEAVY INDUSTRIES (HHI)	BULK CARRIER ORE STRENGTHENED	1	172,000	4	—
JAPANESE INTERESTS	TSUNEISHI	BULK CARRIER ORE STRENGTHENED	5	76,300	4	—
COSCO	TSUNEISHI	BULK CARRIER ORE STRENGTHENED	2	76,000	4	—
TOLANI SHIPPING	OSHIMA SHIPBUILDING	BULK CARRIER ORE STRENGTHENED	1	55,300	4	—
JAPANESE INTERESTS	MITSUI	BULK CARRIER ORE STRENGTHENED	1	55,000	4	—
ODFJELL	SZCZECIN SHIPYARD	CHEMICAL TANKER	2	39,500	4	110
KYOYU KISEN	WATANABE	CHEMICAL TANKER	1	16,000	3	—
TARBIT SHIPPING	SHANGHAI EDWARD	CHEMICAL TANKER	1	13,600	4	21
GERMAN INTERESTS	VOLHARDING	CHEMICAL TANKER	1	9,000	4	—
TAIHEIYO KAIUN	SHIN KURUSHIMA	CHEMICAL TANKER	1	8,600	4	—
NEVA RIVER T	KRASNOYE SORMOVO	CHEMICAL TANKER	2	8,200	5-Apr	—
EVERARD	QINGSHAN SHIPYARD	CHEMICAL TANKER	4	3,750	5-Apr	20
ODFJELL	NEW SZCZECIN	CHEMICAL TANKER	2	39,000	4	110
SOCIETA NAVIGATIONE	NUOVI CANTIERI APUANIA	CHEMICAL TANKER	1	15,200	4	—
TABUCHI KK	SHITANOE ZOSEN	CHEMICAL TANKER	1	7,800	3	—
WONSILD	CASSENS	CHEMICAL TANKER	4	6,300	4	72
IGNAZIO MESSINA	CANTIERE NAVALE DI PESARO	CHEMICAL TANKER	1	6,000	3	—
ITALIAN INTEREST	CANTIERE NAVALE DI PESARO	CHEMICAL TANKER	1	6,000	3	—
KNUTSEN OAS SHIPPING	NAVAL GIJON	CHEMICAL TANKER	1	35,800	3	27
STOLT NIELSEN	SHIN KURUSHIMA	CHEMICAL TANKER	1	32,000	4	—
STOLT NIELSEN	KITANIHON	CHEMICAL TANKER	1	19,500	3	—
JAPANESE INTERESTS	FUKUOKA SHIPBUILDING	CHEMICAL TANKER	1	12,300	3	—
UNKNOWN	FUKUOKA SHIPBUILDING	CHEMICAL TANKER	1	9,000	3	—
JAPANESE INTERESTS	MURAKAMI HIDE	CHEMICAL TANKER	3	8,800	3	—
CRESCENT TANKSHIPS	ROUSSE SHIPYARD	CHEMICAL TANKER	2	3,500	3	—
ITALIAN INTEREST	VOLHARDING	CONTAINER	1	5,700	4	8
ORIENT OVERSEAS CONTAINER LINE	SAMSUNG	CONTAINER	2	—	5	146
ER SCHIFFAHRT	HYUNDAI HEAVY INDUSTRIES (HHI)	CONTAINER	5	—	5	375
NORDCAPITAL	SAMHO NEW SHIPYARD	CONTAINER	2	—	4	88
UGLAND GROUP	KVAERNER WARNOW WERFT	CONTAINER	4	—	4-Mar	130
IRISL	AKER MTW WERFT	CONTAINER	4	—	4-Mar	136
IRISL	KVAERNER WARNOW WERFT	CONTAINER	2	—	4	68
IRISL	BANDAR ABBAS	CONTAINER	5	—	5	—
IRISL	THYSSEN NORDSEEWERKE	CONTAINER	1	—	4	—
FERROSTAAL	DAMEN OKEAN	CONTAINER	2	—	4-Mar	—
THIEN & HEYENGA	FERROSTAAL	CONTAINER	4	—	4	70
HERMAN BUSS	ZHOUSHAN	CONTAINER	5	—	5-Apr	75
HERMAN BUSS	ZHOUSHAN	CONTAINER	2	—	5-Apr	22
P&O NEDLLOYD	ISHIKAWAJIMA HARIMA H.I. (IHI)	CONTAINER	2	—	5	140
CONTI REEDEREI	HYUNDAI HEAVY INDUSTRIES (HHI)	CONTAINER	2	—	4	112
HAMBURG SUD	DAEWOO	CONTAINER	6	—	5-Apr	336
NORDCAPITAL	HYUNDAI HEAVY INDUSTRIES (HHI)	CONTAINER	2	—	4	88
DEOMAR	HYUNDAI HEAVY INDUSTRIES (HHI)	CONTAINER	1	—	4	—
PETER DOHLE SCHIFFAHRTS	NEW SZCZECIN	CONTAINER	1	—	4	33
IRISL	THYSSEN NORDSEEWERKE	CONTAINER	1	—	3	—
IRISL	ISOICO	CONTAINER	5	—	4	—
KOREA MARINE TRANSPORT CO.	HANJIN	CONTAINER	2	—	3	48
SCHULTE GROUP	GUANGZHOU	CONTAINER	2	—	5-Apr	42
PACIFIC INTERNATIONAL LINES	DAE SUN	CONTAINER	2	—	4	40
NAMSUNG SHIPPING	DAE SUN	CONTAINER	2	—	4	39
P&O NEDLLOYD	HYUNDAI HEAVY INDUSTRIES (HHI)	CONTAINER	2	34,000	4	55
OLTMAN	HYUNDAI HEAVY INDUSTRIES (HHI)	CONTAINER	1	—	4	40
VIETNAMESE OWNER	HA LONG SHIPYARD	CONTAINER	1	—	4	—
SCHLUTER	QINGSHAN SHIPYARD	CONTAINER	2	—	4-Mar	—
QATAR SHIPPING CO	CHEOY LEE	CREWBOAT	1	—	3	—
UNKNOWN	CHESAPEAKE	CRUISE SHIP	1	—	4	—
SUEZ CANAL AUTHORITY	MITSUBISHI H.I.	DREDGER SUCTION HOP	1	15,000	4	—
JAN DE NUL NV	IZAR	DREDGER SUCTION HOP	2	—	3	—
TALLINK	FINNYARDS	FERRY	1	—	4	147
SOUTH KOREAN GOVT.	ILHUNG	FISHERIES PROTECTION	2	—	3	13
DISTRICT OFFSHORE	FITJAR	FISHING	1	3,500	3	—
SPANISH INTERESTS	ARMON	FISHING	1	191	3	—
IRISH INTERESTS	ARMON	FISHING	1	151	3	—
SPANISH INTERESTS	ARMON	FISHING	1	132	3	—
PORTUGUESE INTERESTS	VIANA DO CASTELO	FISHING	1	—	3	—
KYOKUYO SUISAN	MIHO SHIPYARD	FISHING	1	—	3	—
UNKNOWN	BARRERAS	FISHING	2	—	3	—
RUSSIAN INTEREST	KHABAROVSK	FISHING	1	560	3	—
CHINA NAT OFFSHORE	SHANGHAI WAIGAOQIAO	FPSO	1	170,000	4	—
KAWASAKI KINKAI KISEN	HIGAKI ZOSEN	GENERAL CARGO	2	10,100	4	—

Ferlship's New Contracts

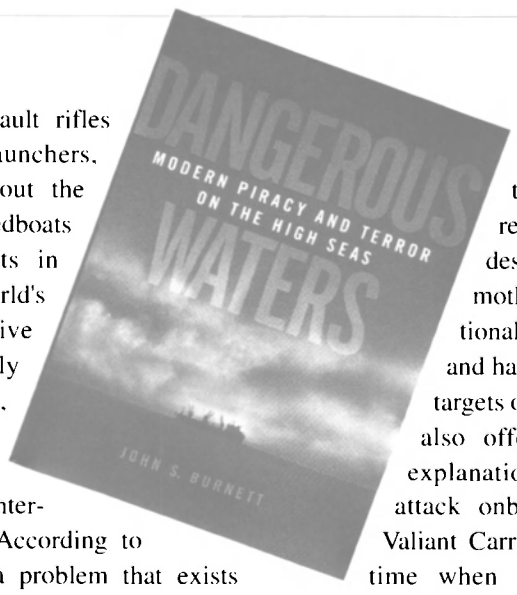
Owner	Builder	Type	No.	DWT	Deliv.	Price ($)
KAWASAKI KINKAI KISEN	NISHI	GENERAL CARGO	2	9,000	4-Mar	—
NATIONAL PETROLEUM CONSTRUCTION	COCHIN SHIPYARD	GENERAL CARGO	1	29,000		—
BUILDER'S ACCOUNT	GISAN	GENERAL CARGO	1	5,800	4	—
UKRRICHFLOT JOINT STOCK S.C.	DAMEN OKEAN	GENERAL CARGO	6	6,000	5-Apr	—
TOWA KAIUN	KEGOYA DOCK	GENERAL CARGO	1	3,200	3	—
RUSSIAN INTEREST	ZVYOZDOCHKA	GENERAL CARGO	1	396	3	—
BELUGA SHIPPING	VOLHARDING	HEAVY-LIFT CARGO	2	—	3	33.2
RUSSIAN GOVT	KVAERNER MASA-YARDS INC	ICEBREAKER	1	5,200	3	—
A. P. MOLLER/QATAR	SAMSUNG	LNG	2	—	4	—
DOHA MARINE SERVICE	STX (DAEDON)	LPG	1	17,000	4	32
SONATRANCH	KAWASAKI H.I.	LPG	2	—	5-Apr	98
BERTLING	KOUAN	MULTI PURPOSE	2	34,000	5-Apr	33.2
KREY SCHIEFAHRTS	QINGSHAN SHIPYARD	MULTI-PURPOSE	2	12,000		29
FINTER GRONINGEN	BODEWES SCHEEPSWERVEN	MULTI-PURPOSE	5	3,400	4-Mar	—
SCHOELLER HOLDINGS	DAUAN SHIPYARD	MULTI-PURPOSE	3	34,000	5	—
NEW WORLD FIRST FERRY	IMAGE MARINE	PASS/FERRY	2	—	3	—
US INTERESTS	AUSTAL USA LLC	PASS/FERRY	1	—	3	—
US INTERESTS	BODEWES VOLHARDING	PASS/FERRY	1	—	3	—
WAXHOLMS ANGFARTYGS	MOEN SUP AS	PASSENGER	1	—	4	—
EGYPTIAN INTERESTS	ARAB HEAVY INDUSTRIES	PASSENGER	1	—	3	—
NAVIERA ARMAS	BARRERAS	PASSENGER/RoRo	2	—	4	—
TALLINK	AKER FINNYARDS	PASSENGER/RoRo/FERRY	1	—	4	147
US NAVY	INCAT AUSTRALIA	PASSENGER/VEHICLE	1	—	3	—
PT PELNI	MEYER WERFT	PASSENGER/VEHICLE	1	—	4	—
ALASKA MARINE HIGHWAY	CONRAD INDUSTRIES	PASS./VEHICLE/FERRY	1	—	3	—
OKI KISEN	MITSUBISHI H.I.	PASS./VEHICLE/FERRY	1	—	4	—
UNKNOWN	BARRERAS	PASS./VEHICLE/FERRY	1	—	4	—
ISTANBUL DENIZ OTOBUSLERI	FJELLSTRAND AS	PASS./VEHICLE/FERRY	2	—	4-Mar	45
JAPANESE INTERESTS	NAIKAI	PASS./VEHICLE/FERRY	1	—	3	—
INDONESIAN GOVERNMENT	ASTILLEROS GONDAN	PATROL VESSEL	2	—	3	—
HUAL AS	DAEWOO	PCTC	3	—	5	141
US INTERESTS	HALTER MARINE INC.	PLAT SUPPLY VESSEL	1	—	3	—
DISTRICT OFFSHORE	MYKLEBUST MEK VERKSTED	PLAT SUPPLY VESSEL	1	—	4	—
UNKNOWN	AKER AUKRA	PLAT SUPPLY VESSEL	1	2,210	3	17
DOF MANAGEMENT	FITJAR	PLAT SUPPLY VESSEL	1	—	3	—
NORWEGIAN INTERESTS	HAVYARD LEIRVIK	PLAT SUPPLY VESSEL	1	—	4	4
SEAUON SHIPPING	WUHU SHIPYARD	PLAT SUPPLY VESSEL	1	—	4	—
CNC/EXPEDO	NEW CENTURY	PRODUCTS TANKER	2	73,000	4	—
BYZANTINE	STX (DAEDON)	PRODUCTS TANKER	1	73,000	5	31.5
PARADISE NAVIGATION	HUDONG SHIPYARD	PRODUCTS TANKER	1	72,000	4	30
SOUTH AFRICAN MARINE	STX (DAEDON)	PRODUCTS TANKER	2	51,000	4	—
OCEAN TANKERS PTE.	SHIN-A SHIPBUILDING	PRODUCTS TANKER	4	49,700	5-Apr	96
FORTUM	JINUNG	PRODUCTS TANKER	2	25,000	4	—
SWEDISH INTERESTS	FERUS SMIT	PRODUCTS TANKER	1	7,550	4	—
WOOLIM SHIPPING	NOK BONG	PRODUCTS TANKER	1	3,500	3	11
JR RIX	HEPWORTH	PRODUCTS TANKER	1	500	3	—
CHINA SHIPPING DEV CORP	DAUAN SHIPYARD	PRODUCTS TANKER	1	110,000	5	35
SCHULTE GROUP	HYUNDAI HEAVY INDUSTRIES (HHI)	PRODUCTS TANKER	1	75,000	4	33.4
B+H GROUP	STX (DAEDON)	PRODUCTS TANKER	2	74,000	5	62
PCL	SAMSUNG	PRODUCTS TANKER	1	73,000	4	31
SANKO KISEN	ONOMICHI	PRODUCTS TANKER	1	71,000	4	—
RESTIS	STX (DAEDON)	PRODUCTS TANKER	2	51,000	5	53
SCOPE MANAGEMENT	GUANGZHOU	PRODUCTS TANKER	2	47,000	5	52
B+H GROUP	STX (DAEDON)	PRODUCTS TANKER	6	47,000	5	159
TSAKOS GROUP	HYUNDAI MIPO	PRODUCTS TANKER	2	37,000	4	49
ATHENIAN SEA CARRIERS	HYUNDAI MIPO	PRODUCTS TANKER	4	37,000	4	98
ARMINTER	HYUNDAI HEAVY INDUSTRIES (HHI)	PRODUCTS TANKER	1	37,000	4	25
THENAMARIS MARITIME INC.	HYUNDAI HEAVY INDUSTRIES (HHI)	PRODUCTS TANKER	1	37,000	3	24
NATIONAL IRANIAN TANKER CO (NITC)	HYUNDAI MIPO	PRODUCTS TANKER	3	35,000	4	78
IRISL	ISOICO	PRODUCTS TANKER	2	35,000		—
BESIKTAS SHIPPING	CICEK	PRODUCTS TANKER	2	16,000	4	40
CASPIAN SHIPPING	KRASNOYE SORMOVO	PRODUCTS TANKER	2	12,000	4	—
CASPIAN SHIPPING	KRASNOYE SORMOVO	PRODUCTS TANKER	2	8,000	3	—
A. P. MOLLER	DALIAN NEW	PRODUCTS TANKER	2	110,000	5-Apr	—
UNIQUE SHIPPING	DAEWOO	PRODUCTS TANKER	1	105,000	4	37
D'AMATO DI NAVEGAZIONE	HUDONG SHIPYARD	PRODUCTS TANKER	2	75,000	5-Apr	—
TORM A/S	HYUNDAI HEAVY INDUSTRIES (HHI)	PRODUCTS TANKER	1	75,000	4	—
DYNACOM	ONOMICHI	PRODUCTS TANKER	2	71,000	4	—
NOVOSHIP	HYUNDAI MIPO	PRODUCTS TANKER	2	46,000	5	54
JAPANESE INTERESTS	ONOMICHI	PRODUCTS TANKER	1	46,000	—	—
JAPANESE INTERESTS	TSUNEISHI	PRODUCTS TANKER	1	46,000	4	—
UNKNOWN	SHIN KURUSHIMA	PRODUCTS TANKER	1	45,800	4	—
NITC	HYUNDAI MIPO	PRODUCTS TANKER	2	35,000	4	52
MARINE CROSS	HYUNDAI MIPO	PRODUCTS TANKER	6	31,500	4	—
KIRONA TANKERS	NAIKAI	PRODUCTS TANKER	2	18,000	4-Mar	—
DALIAN XINSHAN SHIPPING	WENZHOU	PRODUCTS TANKER	1	3,800	3	—
NIPPON YUSEN KAISA (NYK)	IMABARI SHIPBUILDING	PURE CAR CARRIER	4	17,000	4	160
NIPPON YUSEN KAISA (NYK)	SHIN KURUSHIMA	PURE CAR CARRIER	4	17,000	5-Apr	160
UNKNOWN	ISHIKAWAJIMA HARIMA H.I. (IHI)	PURE CAR CARRIER	2	15,000	—	—
JAPANESE INTERESTS	MITSUBISHI H.I.	RO-RO	4	6,900	4-Mar	—
NIPPON YUSEN KAISA (NYK)	IMABARI SHIPBUILDING	RO-RO	1	—	3	—
VOSTA LMG	DAMEN SHIPYARDS	SUCTION E61DREDGER	1	3,000	3	—
KRISTEN NAVIGATION	DAEWOO	TANKER	1	300,000	4	—
PERTAMINA	HYUNDAI HEAVY INDUSTRIES (HHI)	TANKER	2	300,000	4	130
CERES HELLENIC (G P UVANOS)	SASEBO	TANKER	2	165,000	4	86
MITSUI O.S.K. LINES (MOL)	TSUNEISHI	TANKER	1	106,000	4	41.5
D'AMATO DI NAVEGAZIONE	HUDONG SHIPYARD	TANKER	2	72,000	5	60
FRONTUNE	HITACHI ZOSEN	TANKER	2	296,000	4	—
KRISTIAN GERHARD JEBSEN	HYUNDAI HEAVY INDUSTRIES (HHI)	TANKER	1	159,460	3	44
BP SHIPPING	SAMSUNG	TANKER	4	115,000	4	—
MALAYSIAN INT.SHPG. CORP. (MISC)	SAMSUNG	TANKER	1	105,000	4	—
MURMANSK SHIPPING	ADMIRALTEISKIY	TANKER	2	70,000	—	55
LMZ TRANSOIL	DAEWOO	TANKER	1	69,000	4	—
KYOEI KAIUN	ISHIKAWAJIMA HARIMA H.I. (IHI)	TANKER	1	300,000	904	—
VIKEN SHIPPING	IMABARI SHIPBUILDING	TANKER	1	157,000	4	—
GREAT EASTERN SHIPPING CO. GESCO	SAMSUNG	TANKER	1	115,000	4	—
K LINE	IMABARI SHIPBUILDING	TANKER	2	107,000	5-Apr	—
MALAYSIAN INT.SHPG. CORP. (MISC)	SAMSUNG	TANKER	2	105,000	4	67
RUSSIAN INTEREST	VOLGOGRAD SHIPYARD	TANKER	1	6,500	3	—
CIRESA BUNKER	UNION NAVAL DE VALENCIA	TANKER	1	4,999	3	—
KIRONA TANKER	MURAKAMI HIDE	TANKER/ASPHAT CARR.	3	3,650	3	—
UNKNOWN	DAMEN SHIPYARDS	TUG	1	550	3	—
SINGAPORE INTERESTS	MARINTEKNIK SING.	TUG	3	—	3	—
UNKNOWN	ARMON	TUG	2	—	3	—
WUSMULLER	ASTILLEROS ZAMACONA	TUG	1	—	3	—
RUSSIAN GOVT.	3 MAJ	UTILITY VESSEL	1	—	3	—
JAPANESE INTERESTS	TSUNEISHI	VEHICLE CARRIER	1	76,300	4	—
CIDO SHIPPING	KANASASHI CO.	VEHICLE CARRIER	2	13,500	4	—

Book Review

Danger on the High Seas

A tale of survival could best describe **John S. Burnett's** experience onboard his sloop Unicorn in January 1992. Sailing solo across the South China Sea to Singapore — one of the busiest shipping lanes in the world — Burnett was attacked by pirates. However, with luck on his side, Burnett, who is a journalist and professional seaman, survived. Following this harrowing experience, Burnett was prompted to investigate further the world of modern-day piracy — world that is as shocking as it is terrifying.

Dangerous Waters: Modern Piracy and Terror on the High Seas (Dutton, $24.95), provides an investigative look into maritime terrorism on the world's oceans. Burnett holds readers with his exploration of resurgence of piracy and also explains why this subject is increasing at such a rapid rate. It is a little-known fact, which Burnett reveals, that off the coasts of nearly all continents, pirate attacks worldwide amount to several thousand each year. Since approximately 95 percent of the world's commerce is transported via ship, including 60 percent of the world's crude oil, it is therefore easy to suspect the potential for an economic and environmental disaster is rather high. Often depicted as high-class rumrunners by the movie industry, pirates are anything but. They can range anywhere from local seamen looking for a quick and easy fix, to highly-experienced guerillas, rogue military units or former seafarers recruited by high-level crime organizations. Often armed with sophisticated weaponry such as machetes, assault rifles and grenade launchers, pirates move about the high seas via speedboats and fishing boats in search of the world's largest, lucrative vessels, mainly supertankers, cargo ships and cruise ships — along coasts or international waters. According to Burnett, this is a problem that exists worldwide. "There is not a shipping lane, a navigable strait, and important canal that is safe from those determined to take over a ship," says Burnett.



Highlighted in this true account is the author's journey aboard a Very Large Crude Carrier (VLCC) as it transits the most pirated waters in the world en route to a refinery in Singapore from the oil fields of the Persian Gulf. VLCC's, which weigh in excess of 300,000 tons, are able to carry approximately two million barrels of crude. Yet, despite their mammoth size, are exceptionally vulnerable to, and have been, frequent targets of pirates. Burnett also offers an in-depth explanation of a pirate attack onboard oil tanker Valiant Carrier in 1992 — a time when piracy had not reared its head as a high concern. Burnett outlines the assault on the ship's master and his family and how it fueled the creation of the Piracy Reporting Center, which transmits daily alerts to ships worldwide. An in-depth discussion as to why, despite heavily trafficked shipping lanes, these attacks still occur – leaving crews isolated and vulnerable.

Circle 51 on Reader Service Card

Market Report: Long-Term Healthy LNG Ship Demand

The healthy LNG ship newbuilding orderbook is likely to continue through to the end of this decade. An additional 50 new ships will be required for delivery in-service within the next 10 years provided LNG growth continues at eight percent. This was amongst one of a number of detailed conclusions from recent research into LNG ship supply and demand, the results of which were presented recently at the North American LNG conference in Houston by **Graham Marshall,** V P. Marine Support, Lloyd's Register Americas Inc.

There are a welter of new liquefaction and re-gasification projects worldwide. Of course not all will come to fruition. Figure 1 shows the most likely worldwide growth of LNG import capacity over the next 10 years.

In the Americas the U.S. is the leading market for development with not only excess capacity from its existing terminals still to fill but also a doubling of capacity due to expansion projects at existing terminals. In addition to this there are green and brown field import plant developments. Overall, the author believes that U.S. LNG import plant capacity will increase 10-fold over the next decade spurred by clean-burning electricity generation initiatives and political will to mitigate reliance upon Middle Eastern oil for energy supply. Mexico is also a key developing market with at least four plants likely to be developed — one in the Gulf and the rest on the West Coast. Taken together the U.S. and Mexico is destined to expand current LNG import demand by almost 50 percent.

Europe is also expanding import capacity although not so dramatically. The most robust market is Spain where there are plans well advanced for three plant expansions and for three new plant at well developed stages. New markets are appearing in both the U.K. and Portugal. Italy is likely to have two additional import terminals by the end of this decade and Turkey has one plant project that is likely to succeed given the current oversupply and economic slowdown being experienced. These projects will increase European LNG import capacity by about 250 percent by the end of the decade.

In Asia there are two key development markets — India and China. The former started this century with a dozen import plant, today the author believes only three or four may materialize and even they may struggle to survive. China has four plant under development. The largest of the world's LNG markets, Japan, has one plant under development and Korea also has one plant under development. Overall the Asian market will continue to be the single dominant market for LNG with just under half of the world's LNG import capacity.

Should these developments continue by the end of this decade it is possible that the U.S. could be the world's second largest market for LNG after Japan. However, we must remember that the world has been here before.

There is an adequate supply of LNG since global liquefaction facility project capacity is greater than re-gasification project capacity. Adding all these projects together and taking note of relationships between suppliers and consumers allows an estimate ship demand. Taking a view on the success of each development in terms of load factor enables several viewpoints to be taken modeling growth rates of 10 percent (Optimistic); eight percent (Realistic); and five percent (Pessimistic). The effect of ship retirements can be accounted for, as can be the effect of new ship deliveries.

It can be seen that ship supply is tracking the high growth rate scenario. Should the growth rate turn out to be lower then there will be ships delivered without immediate employment. The long-term outlook for these ships is still good. Over the next two years there are 38 ships that will be delivered. Combining this with the greater number of terminals becoming available it is highly likely that spot market development will become even more favorable and that the modus-operandii of crude operators is likely to develop where baseload shipping capacity is covered with long-term chartered or owned tonnage and peak capacities are covered by a mixture of short-term or spot chartered vessels. This is evidenced by existing importers re-negotiating supply contracts and an increasing number of short-term shipping fixtures. Over 50 spot cargoes have been delivered into the U.S. in 2002.

There will still be some LNG ship orders placed by the market makers over the next few years for their LNG import/export projects although not as many as placed in the past two years. The market followers amongst the energy companies are likely to absorb any spare ship capacity with short-term contracts. Given the average newbuild delivery period is 30 months (depending upon containment type) then newbuilding orders will need to be placed at latest by late 2004 assuming a growth rate of eight percent. Since 1985, the growth rate in internationally traded LNG has been just above seven percent (ref: Cedigaz) — without considering the political and environmental issues then this may well be expected to continue. Hence in the author's view, growth of internationally traded LNG is likely to follow a slightly higher growth scenario (eight percent). This article is a synopsis of the commercial part of the full paper presented at the North American LNG conference, Houston, Texas, November 18-20, 2002.

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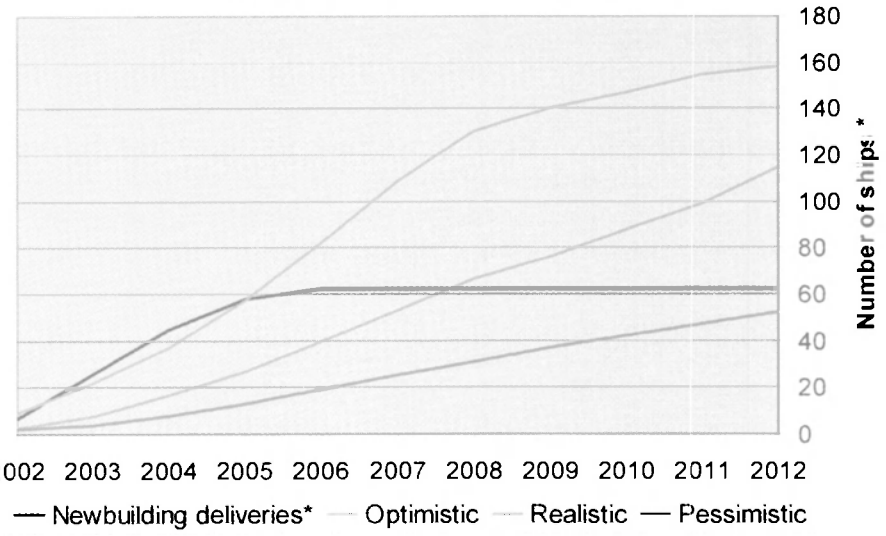
Accumulation of number of ships needed to meet supply needs for all LNG projects



	Current Consump. of LNG	New Capacity by 2012
Belgium	1.8	
China	—	10.5
Dom. Republic	2	—
France	7.6	6.8
Greece	0.4	—
India	—	17.8
Italy	3.8	6.5
Japan	54.1	4
Korea	15.9	8.3
Mexico	—	26.5
Portugal	—	2.3
Puerto Rico	0.5	—
Spain	7.2	12.6
Taiwan	4.6	4.3
Turkey	3.5	4.4
UK	—	3.8
USA	4.8	47.4

Existing Capacity 2002	104 Mtpa
New Capacity by 2012	158 Mtpa
Maximum Total Capacity, 2012	262 Mtpa

Source: Lloyd's Register

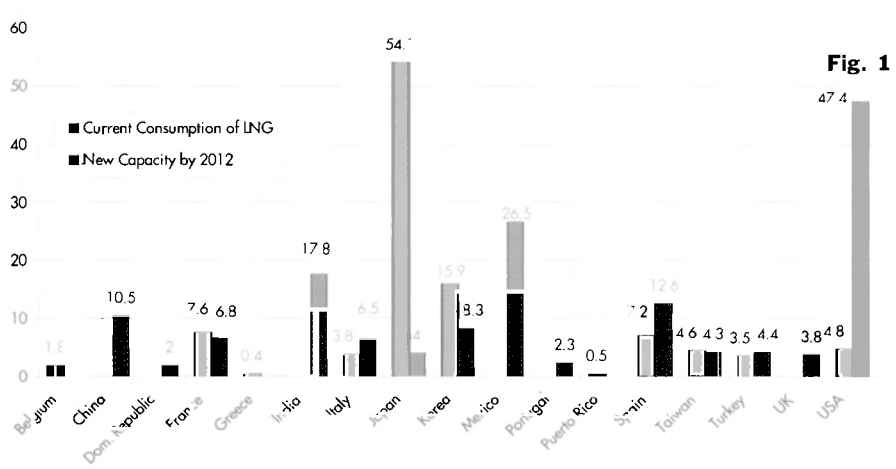


Fig. 1

Thales Prepares to take the Market by Storm

by Greg Trauthwein

Whether your philosophy is "less is more" or "bigger is better", Thales (pronounced "TAL-less") Navigation delivers both.

Thales Navigation emanates from parent company Thales, a $10 billion Goliath that has astutely purchased a number of marine electronic brand name product companies, such as GPS maker Magellan and its well-known Ashtech brand, in recent years, helping to enlarge an already expansive company. It recently consolidated all of its professional GPS products, including the Ashtech brand, under the Thales Navigation brand name, a re-branding which is designed to unify Thales Navigation's professional product offering and help streamline the company's marketing communications efforts.

Maritime Reporter & Engineering News recently caught up with **Neil Vancans**, general manager of Thales Navigation's Professional Products Business Unit, to discuss the company's current strategy and future performance. The move towards sole system supplier in nearly every corner of the manufacturing world has resulted in a decade-long corporate consolidation that has resulted in fewer, larger companies. While bigger does not automatically deliver better, the trend towards fewer, larger companies allows well-run companies to leverage its resources for the strength of all.

"We are interested in selling more than just boxes ... we are interested in packaging these boxes into an engineered solution," Vancans said. "I don't think there is a form of communication that we don't have access to for integration into a package for use onboard ships. We have products that are building blocks, and the completed solutions." Noting the financial resources of the company and its effect on bringing solutions to market, Vancans said "Thales is a $10 billion company, and there is a huge amount of research across a number of different areas, from flight to navy."

While Thales offers the breadth and resources of a large corporate entity, its approach to entering a market, as it hopes to do in the U.S. this year, is decidedly 'mom and pop.' He sees the North American market as one that is in need of a single source solution provider, and admits that the company likes to "get our hands dirty, get onboard vessels, evaluate needs and provide finished solutions."

And while it may seem that further consolidation is unnecessary, Vancans differs. "It is no secret. Smart companies are always looking at all options for growth and to continue to offer better solutions for their customers. We will continue to watch companies as they become available for acquisition or fit the portfolio that we are looking to move into. We will continue to use our financial muscle, and the Thales name."

Currently, the marine business accounts for about 20 percent of Thales Navigation, a figure which should grow to about 30 percent in the next 12 to 15 months, as Vancans sees the marine market as growing more quickly than other niches. Thales acquired Magellan Corporation in 2001, along with its Ashtech brand, and combined it with France-based Thales Navigation, S.A. to form Thales Navigation. Since the acquisition, the company has reached a number of strategic milestones — all rooted in its continuing achievement as a global professional GPS leader. The company restructured its organization to create two distinct business units, one for professional products and one for consumer products, and appointed Vancans as general manager of the Professional Products Business Unit.

Vancans most recently served at Leica both as member of the management board, responsible for Leica's business areas, and as president of Leica Geosystems GPS Business Area. Leica's GPS business grew from $30 million to $90 million under his leadership. The strategic growth of GPS was a major contributor to Leica's highly successful IPO in July 2000. As a native of the U.K. who has lived in the U.S. for six years, Vancans brings a unique and worldwide perspective of the professional GPS business. His experience in leading multi-cultural teams in diverse locations across two continents also made Vancans the perfect choice for Thales Navigation, which has 15 locations across nine countries in North America, Europe, Asia, and Africa.

Dawning of the Age

When discussing new business opportunities such as the U.S., Vancans is quick to clarify that he sees robust growth in the marine surveying, offshore and dredging ends of the market. Thales Navigation's new Aquarius positioning solution is designed to help the company establish market share quickly.

With Thales' dual-frequency Long Range Kinematic (LRK) processing technology, the standard for outstanding performance, users get fast real-time centimeter-level positioning and a fully operational radio link up to 40 km. With LRK, surveyors are able to work at greater distances than they can with conventional real-time kinematic (RTK). Aquarius is also available in a single-frequency version featuring Thales' Kinematic Applications in Real Time (KART) technique.

Users can take advantage of the high performance of the Thales-designed UHF link ("U-Link"), and they also use an HF/MF link ("HM-Link") providing full compatibility with existing networks, such as HF or IALA radio beacons.

Aquarius offers a broad range of features, including a floating power input, a sealed ultra-resistant case and essential interfacing capabilities. The system offers flexibility with its five input/output ports, the TRM100 navigation and control terminal and ConfigPack software.

Aquarius has the built-in potential for additional expansion, depending on the chosen model: It can be upgraded from singe to dual frequency, or even to Aquarius2, which offers a combination of accurate heading and positioning. Aquarius is backward compatible with Thales Navigation's Ashtech 5000 series. Thales Navigation's new Aquarius2 marine survey system combines precise heading capabilities with accurate positioning. Aquarius2 adds a second set of GPS/GNSS channels to allow users to reach dual-frequency heading accuracy of 0.01° or single-frequency accuracy of 0.1° (2 m baseline), depending on the configuration used. The accuracy is made possible by Thales Navigation's exclusive Gyrosky technology.

Circle 51 on Reader Service Card

Skarpenord Launches New Level-Measuring Radar

Scana Skarpenord Langesund (SSL) launched a new marine precision level radar capable of providing ullage measurements of ±0.01%. First introduced as BM70/50 in 1992, the new upgrade BM70MP represents a two-year collaboration with Germany-based KROHNE and increased competitive benefits in radar tank gauging for owners, operators and shipyards. The BM70MP FMCW radar utilizes a high precision microwave board and a linear sweep controller, and its stand-alone operation, ease of servicing or replacing components and limited radar beam angle, makes it an optimal solution for crude oil tankers, as well as all other types of tank ships. BM70MP components (electronics, antenna and coupler) may be serviced/replaced without any gas pressure being released from the tank, due to a unique, heavy-duty glass/steel barrier incorporated below the antenna coupler.

Circle 5 on Reader Service Card

Sperry Marine Offers Flat Screen

Sperry Marine's Decca BridgeMaster E 340 is the first flat-screen radar to be type approved to meet the international carriage requirements for automatic radar plotting aids (ARPA). The flat-screen radars provide significant savings in space and weight over traditional CRT displays. This is especially important for high-speed craft, in which size and weight are significant constraints. The flat-screen BridgeMaster E 340 display has a full 340-cm radar circle as required for ARPA type approval. The active-matrix high-resolution LCD provides wide viewing angles and a bright, clear picture in direct sunshine. The screen may be dimmed to avoid glare for nighttime operation. The 340 radars are available in desktop and deck-standing models, and a kit version is also available, permitting the electronics to be remotely mounted in a separate cabinet.

Circle 9 on Reader Service Card

Transas Offers New Developments

At the Airport, Port & Terminal Security Exhibition in London, Transas showcased its latest IT solutions in the field of marine safety and security. Transas introduced its new development for port and coastal security - Transas Port Security System. The new system incorporates: Radar Site(s), Vessel Traffic Service system, Fleet Monitoring system and a Crisis Management System, all combined by the use of Automatic Identification System and Transas proprietary TX-97 vector electronic cartography. Integration of these advanced technologies can provide an intellectual multi-level protection system for any object that can be attacked or subject to unauthorized access from the sea.

Circle 10 on Reader Service Card

www.maritimereporterinfo.com

Ameri-Force

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

Circle No. 101

Binsfield

Binsfeld Engineering has introduced the new TorqueTrak Revolution Series. It features continuous monitoring and control of torque and power on rotating shafts. The system also monitors shaft speed and direction. It fits any size shaft up to 20 inches in diameter and can be installed without shaft modification or machine disassembly.

Circle No. 102

MaK

The MaK long-stroke engine generation was introduced in 1992 and the M 43 is now the fourth and most powerful series to be introduce to the market as part of the current MaK engine program. The M 43 is built as an inline engine with 6,7,8 and 9 cylinders in the V-engine version. It covers in range from 5400 kW to 16200 kW.

Circle No. 103

Cummins

Cummins' new engine, QSK60, with a power range of 2000-2300 hp (1,492 - 1,716 kW) for propulsion and 1,500-1,825 kWe for auxiliary applications, is currently the most powerful marine engine in their line-up. Quantum System electronics optimize the engine's fueling for reduced emissions, smoke and fuel consumption.

Circle No. 104

Digital Antenna

Digital Antenna has introduced the DA4000 Cellular Phone Radio Frequency Amplifier for the marine industry. The DA4000 provides amplification of transmit and receive signals for improved cellular phone use, enhancing range and system access while decreasing the number of dropped calls in areas where signals are weak.

Circle No. 105

Eaton

Eaton Corp.'s Cutler-Hammer Business unit released a color brochure highlighting PowerNet, integrated software for complete surveillance and management of power distribution systems. The brochure provides information about PowerNet's ability to monitor individual equipment power consumption, track and schedule maintenance, and trouble shoot using real-time and historical data.

Circle No. 106

Evinrude

Bombardier Recreational Products introduces the full line of Evinrude outboard engines available for 2003. All Evinrude direct injected outboard engines, from the 75-hp model up to the powerful 250-hp model, feature the exclusive Ficht direct injection, a unique computer-controlled direct injection (DI) system that injects the fuel charge directly into each cylinder.

Circle No. 107

GE

GE Transportation Systems recently announced the integration of its newly formed Marine & Stationary Power component into its portfolio of product offerings. The range of GE Diesel medium speed engines includes 12V and 16V cylinder configurations ranging between 2,500 - 4,100 hp.

Circle No. 108

McMurdo

McMurdo Transas MT-1 UAIS Transponder is designed to meet the SOLAS requirements for Universal Automatic Identification Systems. It features a touch-screen LCD minimum display and transmits the ship's data to other vessels as well as shore-based VTS systems. It utilizes VHF channels and is a ship-borne mobile station.

Circle No. 109

MMC

The MMC Oxygen-sensor tells you the exact depth of the sensor and percent oxygen in the inert gas in each tank. There's no mess or guesswork. The unit is battery operated, completely portable, with a built-in self-calibrating feature and is approved by BASEEFA as intrinsically safe. Just lock it on an MMC vapor control valve and lower the sensor to the correct ullage level.

Circle No. 110

North American Marine Jet

North American Marine Jet produces the Traktor Jet HT, which is a large diameter marine jet propulsion unit that can pump a high volume of water at slow velocity to deliver high thrust per horsepower, equal to or exceeding propeller performance in the 0-20 knot range. Traktor Jets also offer the added benefits of low maintenance, easy installation, quiet operation and no hull protrusions.

Circle No. 111

PMC

For 34 years, PMC has designed and manufactured many products to fill customer requirements. Our latest brochure is an overview of our current products, with a focus on our cutting edge digital electronics in the marine propulsion control and instrumentation fields.

Circle No. 112

Schottel

Schottel's versatile L-drive Thruster accepts either horizontal or vertical drive applications, which optimizes prime mover location and ensures economical, space-saving installation. L-drives are directly coupled to the drive of the prime mover, with power transmitted via a single pair of bevel gears to the propeller.

Circle No. 113

SeaState

Seastate combines the intelligent use of leading edge technology with experience in motion control to deliver the ultimate in system integration. From feasibility study to complete modular systems ready for installation, new projects or retrofit, call Seastate — the people who really know motion.

Circle No. 114

Vorth

Voith offers a brochure detailing the Voith-Schneider Propeller. The foundation, propeller well, consists of a cylindrical shell with a flange. The propeller well must form an integral part of the bottom structure of the vessel so that in addition to the propeller weight, the forces and moments resulting from the propeller thrust can also be transmitted without stress concentrations into the ship's hull.

Circle No. 115

Xenex

The Navigence XN2000N is a multifunctional network server that provides ARPA, radar and ECS control to multiple navigation stations over an Ethernet network. Each station can display a vessel's real-time movement, radar images, and an electronic chart together-making navigation easier and safer.

Circle No. 116

Hatteland

The new complete product line for marine and naval applications from Hatteland Display. Display range from 15 to 23.1 in. Marine tested and type approved.

Circle No. 117

LALIZAS

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

Circle No. 118

Incat

Incat — The Magazine is produced six times a year by Incat Austrailia Pty Ltd, builders of some of the world's fastest large vehicle and passenger ferries. Recent Incat deliveries to Europe include four fast 315 ft. (96 m) catamaran ferries operating in Spain and the Royal Australian Navy's HMAS Jervis Bay which carries and troops between Darwin and East Timor.

Circle No. 119

Volvo Penta

Volvo Penta is a supplier of marine engines for commercial use with engines ranging in power output from 100 to 2,000 hp. They offer an engine program for powering vessels ranging from small fast rescue and patrol boats to tugboats, fishing boats and other displacement vessels. ships and vessels.

Circle No. 120

Integro

Integro offers a complete Welding Pre-Heat System designed to heat large pieces of structural steel to appropriate temperatures, ensuring solid and efficient welds. The Integro Pre-Heat System consists of a controller/timer with extension cords and power streamers that bring power to your application and thermally designed aluminum steel.

Circle No. 121

Ballast Technologies, Inc.

Ballast Technologies, Inc. (BTI) has been a provider and installer of fixed ballast materials since 1983. The company's product and service known as Perma Ballast, is widely acknowledged to be the quickest and most cost-effective method of ballast installation today.

Circle No. 122

Craft Bearing

Craft Bearing manufactures split cylindrical roller bearings, which combine all the advantages of conventional anti-friction roller bearings with the feature of being easily assembled around a shaft. The assembly is engineered in halves to ease installation, inspection, and/or replacement of pillow block bearings without removing or disrupting other elements of the system.

Circle No. 123

Mid-West Instruments

Mid-West Instrument has designed a model 120 series especially for seawater applications. The weather-resistant construction is standard with shatter resistant lens and over-range protection to rated working pressure. Body materials are aluminum, bronze or monel. The range is 0-5 PSID through 0-100 PSID (0.3 bar to 7.0 bar).

Circle No. 124

Trombetta

Trombetta Motion Technologies' new Bi-Directional Latching Actuator brings increased flexibility and simplicity to switchgear applications. The actuator can be customized to work in most types of switchgear applications — vacuum switchgear applications in particular. It features a simplified remote actuation, which can extend or retract possible with only two electrical inputs.

Circle No. 125

BUYER'S DIRECTORY

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

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J.A. Moody Equipment Specialist. Inc., 3223 Phoenixville Pike. Malvern. Pa 19355. (800) 355-3810 (Norteast); 809 Pecan Forest Court, Chesapcake. VA 23322. (757) 641-0080 (Southeast); 2130 7th Ave W. Scattle. WA 38119. (206) 691-1000 (West): www.jamesi.com
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Adrick Marine. 81 Mahan St. W. Babylon NY 11758
Bailey Refrigeration. 4986-1 Euclid Road. Virginia Beach. VA 23462
Cospolich Refrigeration, 14695 Highway 61, Norco LA 70079
Flagship Marine 2427 SE Dixie Highway, Stuart. FL 34996
Port-A-Cool. P.O. Box 2108. Center. TX 75935
Stork Bronswerk Inc., 3755 C boul.Matte. Brossard. Quebec Canada J4Y2P4
Taylor Made Environmental PO Box 15299 Richmond. VA 23227
AIRHORNS/SIGNALING EQUIPMENT
Airchime Mfg. Co. Ltd., 5478 267th Street, Gloucester Industrial Estate, Langley. B.C. Canada V4W 3S8
ALARMS, FACTORY MUTUAL-APPROVED
NREC 1701 Engineers Rd Belle Chase. LA 70037
SELCO 353 A Asbury Commons Dr., Atlanta. GA 30338
ALUMINUM BOATS
Island Boats 6806 Highway 90 East New Iberia LA 70560
Sea Ark Marine PO Box 210 Monticello AR 71655-0210
William E Munson Co., 18130 Sunset Way. Edmonds WA 98026
ANCHORS AND CHAINS
Crandall Dry Dock Engineers Inc., P.O. B. 505804. MA 02150
GJ Wortelboer Jr. B.V. PO Box 5003, 3008 AA Rotterdam, Netherlands
Washington Chain Inc., Box 3645, Seattle, WA 98124
AUTOMATED SELF UNLOADING
Seabulk Systems Inc., Suite 100. 3751 Shell Road. Richmond, British Colambia. CANADA V6X2W2
AUTOPILOT SYSTEMS
Beier Radio1990 Industrial Ave Harvey. LA 70058
ComNav Marine Ltd., #15-13511 Crestwood Place, Richmond,BC V6V 2G1
Mackay Communications. 2721 Discovery Dr., Raleigh. N.C. 27616-1851
BALLAST
Ballast Technologies .4620 S. Coach Dr. 85714 . Tucson, AZ
Redland Genstar Inc.. Executive Plaza IV. Hunt Valley. MD 10912-1031
BARGE RENTALS
Cashman Equipment, Three Dolphin Way, Boston, MA 02210
BEARING—Rubber, Metallic, Non-Metallic
American Babbitt Bearing PO Box 3069 Rt 2 Huntington. WV 25702
Craft Bearing 2506 58th St Hampton, VA 23661
Duramax Marine LLC 17990 Great Lakes Parkway. Hiram,OH 44234
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Orkot Composites., 2535 Prairie Rd., Unit D. Eugene, OR 97402
Sohre Turbomachinery 132 Gilbertville rd PO Box 889 Ware. Mass 01082
Thordon Bearings Inc., 3225 Mainway. Burlington. Ont., CANADA L7M 1A6
Vesco Plastics. P.O. B. 40647. Cleveland 2022 SOUTH AFRICA
BILGE SYSTEMS
Fast Systems 14040 Santa Fe Trail Dr. Lenexa, Kansas 66215-1284
BLOCKS & RIGGING
Skookum, P.O. Box 280, Hubbard, OR 97032
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Deltak LLC 2905 Northwest Blvd Ste 150 Plymouth MN 55441 USA
BOATBUILDER
Allen Marine PO Box 1049 Sitka, AK 99835
Hike Metal, Box 698, Wheatley, ON Canada N0P 2P0
Kvichak Marine, 469 NW Bowdoin Pl.,Seattle WA 98107
Sea Ark Marine PO Box 210 Monticello AR 71655-0210
Washburn Doughty. P.O. Box 296, E.Boothbay ME 04544
BOLLARDS
Maritime International, 100 E. Vermilion Street #212, Lafayette. LA 70501
BRIDGE SUNSCREENS
Martek Marine Blinds, Unit 46, Century Business Centre, Maversway, Rotherham, South Yorkshire, S63 5DA
BROKERS
Marcon International, Inc., P.O. Box 1170, Coupeville. WA 8239-1170
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960
BRUSHES
Sohre Turbomachinery Inc 132 Gilbertville Rd PO Box 889 Ware, MA 01082-0889
BULKHEAD SEALS/PANELS
CSD North America. 880 Candia Rd., Unit 10, Manchester, NH 03109
Thermax, 15006 Shaw Rd., Tampa, FL 33625-5500
Thermax 3115 Range Rd Temple, TX 76501
BUOYS
Datrex, P.O. Box 1150, Kinder. LA 70648
Urethane Products 9076 Rosecrans Ave Bellflower. CA 90706
BUTTERFLY VALVES
Norriseal PO Box 40525 Houston. TX 77240
CABLE TRANSIT SYSTEMS
CSD North America, 880 Candia Rd., Unit 10, Manchester. NH 03109
CALIBRATIONS
Standard Calibrations Inc., 908 A Ventures Way. chesapeake VA 23320
CAD/CAM SYSTEMS
Albacore Research, 4196 Kashtan Place, Victoria, B.C. Canada V8X4L7
Autoship Systems Corp., #403, 611 Alexander St., Vancouver, BC, Canada V6A1E
Creative Systems, Inc., P.O. B. 1910, Port Townsend.WA 98368
Kockums Computer Systems AB, PO Box 50555, S-202 15 Malmo SWEDEN
Scientific Marine Services. Inc, 101 State Pl., Suite F. Escondido. CA 92029
Ship Motion Associates, 10 Danforth St., Portland, ME 04101-4567
CAPSTANS
G.J. Wortelboer Jr. BV, P.O.B. 5003, 3008 AA Rotterdam, Netherlands
Superior Lidgerwood Mundy, 1101 John Ave., Superior, WI 54880
CARGO MONITORING & CONTROL SYSTEM
Hermatic Inc., 4522 Center St., Deerpark, TX 77536
CAST IRON REPAIR
In-Place Machining 1929 N. Buffum St, Milwaukee, WI 53212
CHAINS
Crandall Drydock Engineers PO Box 505804 Chelsea, MA 02150
Washington Chain, P.O. Box 3645, Seattle, Wa. 98124
CHEMICALS
Uniservice Americas 57174 Hardin Rd, Slidell, LA 70461
CLASSIFICATION SOCIETY
Lloyds Register 71 Fenchurch St London EC3M 4B5
CNC PLATE CUTTING
Advanced Fabricating Inc PO Box 3721 Galveston, TX 77552
COATINGS / CORROSION CONTROL / PAINT
Anker Marine Paints, 21 Charles Street, Westport, CT 06880
Chesapeake Specialties Products, 5055 North Points Blvd, Baltimore Md 21219
Chugoku Marine Paints PO Box 73 4793ZH Finaart The Netherlands
DeFelsko Corporation, 802 Proctor Avenue, P.O.Box 676, Ogdensburg,NY 13669
Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
Ferro Corp., 1301 North Flora St., Plymouth, IN 46563
Flow International corp., 23500 64th Ave. south Kent, WA 98032
Hempel Coatings, 10-3511 Viking Way, Richmond, B.C.Canada V6V1W1
International Paint Inc., General Offices, 6001 Antoine Drive, Houston,TX 77091
Jamestown Distrib., P.O. Box 348, Jamestown, RI 02835
Jotun Paints Inc, 1401 Severn St., Baltimore,MD 21230
Mascoat Products, 10890 Alcott Unit 102 Houston, TX 77084
Nace Int'l, 1440 South Creek Dr., Houston, TX 77084
Resto Motive Laboratories PO Box 1335 Morristown, NJ 07962-1235
Sherwin Williams, 101 Prospect Avenue, Cleveland OH 44115
Sigma USA, PO Box 816, Harvey, LA 70059
Wasser High Tech Coatings, 8041 South 228th St., Kent, WA 98032
COMMUNICATIONS SERVICE
Comsat Maritime Services, 6560 Rock Spring Drive, Bethesda, MD 20817-1146
Mantel Marine Communications, 16 E. 41st St., NY, NY 10017
Maritime Telecommunications Networks, Inc., 3044 N Commerce Pkwy Miramar FL 33025
COMPOSITE PILINGS
Hardcore Composites 618 Lambsons Lane New Castle DE 19720
COMPOSITE FENDERING SYSTEM
Hardcore Composites 618 Lambsons Lane New Castle DE 19720
COMPOUNDS
Philadelphia Resins, P.O. Box 309, Montgomeryville, PA 18936
COMPRESSORS
Hatlapa Uetersener Maschinenfabrik Tornescher WEG 5-7 D-25436 Uetersen. Germany
COMPUTER / COMPUTER SOFTWARE
Autoship Systems Corp. #403 611 Alexander St. Vancouver. BC. CANADA V6A1E
Creative Systems. Inc. P.O B 1910. Port Townsend. WA 98368
Fleet Technology. 311 Legget Dr. Karata. Ontario. Canada K2K 1Z8
Lloyd's Register. 100 Leadenhall St. London. England EC3A 3BP
MIL Systems 200-1150 Morrison Drive. Ottawa Ontario K2H 8S9
Navigator PC. Plantation Technology Park. 6601 N W. 14th St Suite 4 Plantation. FL 33313
Ship Motion Associates. 10 Danforth St Portland, ME 04101
COMMUNICATIONS
Beier Radio1990 Industrial Ave Harvey. LA 70058
Inmarsat Ltd. 99 City Road London City EC1Y 1AX England. UK
Japan Radio. 1011 SW Klickitat Way. Bldg B. Suite 100. Seattle.WA 98134
Mackay Comm Inc 2721 Discovery Dr Raliegh NC 27616-18
Rydex: An Inmarsat Ventures Co., 130-13111 Banier Place. Richmond,BC V6V2J1
Sewave. 76 Hennarlund Way. Middletown. RI 02842
World-Link Communications. 74 Main St Framingham MA 01701
COMPUTER SOFTWARE SYSTEMS
Autoship Systems Suite 312-611 Alexander St Vancouver BC V6A1E1
Spec Tec Professor Koth's Vey 1366 Lysaker Norway
CONSOLE - GMDSS
Furuno USA. Inc. 4400 NW Pacific Rim Blvd. Camas. WA 98607
Japan Radio. 1011 SW Klickitat Way. Bldg B. Suite 100. Seattle WA 98134
Mackay Communications. 2721 Discovery Dr., Raleigh. N.C. 27616-1851
CONSULTANTS
Captain R J. Underhill & Associates, P.O. Box 1030 Groves, TX 77619
Elliot Bay Design Group 5301 Shishole Ave NW Ste 200 Seattle WA 98107
CONTAINER LIFT SPREADERS
Tandemloc Inc.,824 Highway 101. Havelock. NC 28532
CONTROL SYSTEM - Monitoring/Steering
Beier Radio1990 Industrial Ave Harvey. LA 70058
Electronic Marine Systems, 800 Femdale Pl. Rahway, N.J. 07065
Electrowave USA. 6125 W Sam Houston Pkwy. Ste 406. Houston,TX 77041
Governor Control Systems, 3190 S W 4th Ave.. Ft Lauderdale. FL 33315
G R. Bowler 2261 Lake Rd. Ontario. NY 14519
Kobelt Manufacturing Co., Ltd. 8238-129 street. Surrey. B C V3W0A6
Kockum Sonics. Inc., 819 Veterans Blvd., Suite 201. Kenner. LA 70068
MMC International, 60 Inip Dr, Inwood NY 11096
Motor Services Hugo Stamp. 3190 S.W. Launderdale. FL 33315
Prime Mover Controls. 3600 Gilmore Way. Burnaby BC V5G 4R8 Canada
Scientific Marine Services. Inc. 101 State Pl. Suite N. Escondido. CA 92029
Seastate, 2 Egmont Road. Henderson. WA-6166. Australia
Stork Kwant, P.O. Box 23, 8600 AA Sneek. Netherlands
Tano Corp.,57017 Citrus Blvd., Suite E. New Orleans, LA 70123
CORROSION CONTROL
Spectrum Trading 108-B Oak St Alpharetta GA 30004
Gardner Denver Water Jetting Systems 8807 Emmett Rd. Suite 100 Houston, TX 77040
Ultra Strip 3515 SE Lionel Terrace Stuart, FL 34996
COUPLERS- Tug & Barge
Intercontinental Engineering, P.O Box 9055, Kansas City, MO 64168
COUPLINGS
Acomann International Corp. 4710 Habana Ave. Tampa FL 33614
American Vulkan. 2525 Dundee Rd., Winter Haven. FL 33884
Centa Corp. 815 Black Hawk Dr., Westmont, IL 60559
Geislinger. Hallwanger Landesstr.3. 5300 Hallwang,Salzburg. Austria
Geislinger Corporation, 200 Geislinger Drive,Battle Creek. MI 49015
Mapeco Products. 91 Willenbrock Rd. Unit B. Oxford, CT 06478
MMC Int'l. 60 Inip Drive, Inwood, NY 11096
CRANE -HOIST–DERRICK—WHIRLEYS
Bisso Marine Co. P.O. Box 4113, New Orleans, LA 70178
E. Crane 241 Executive Dr. #3 Marion OH 43302
Edgewater Machine & Fabricators, P.O Box 358, Edgewater. FL 32132-0358
Holly Hoist Corp., P.O. Box 86. St. Clair Shores. MI 48080-0086
Liebherr-Werk Nenzing Gmbh PO Box 10 A6710. Nenzing Austria
Mi-Jack Products. 3111 West 167th Street. Hazel Crest. IL 60429
Westmont Industries. 10805 Painter Ave.,Santa Fe Springs, CA 90670
CRANKSHAFT DEFLECTION ANALYZER
Prisma Teknik AB Sweden, www.prismateknik.com
CRANKSHAFT GRINDING
Goltens - New York Corp. 160 Van Brunt St. Brooklyn, NY 11231
CRANKSHAFT REPAIR
Goltens - New York Corp. 160 Van Brunt St., Brooklyn, NY 11231
In-Place Machining 1929 N. Buffum St Milwaukee, WI 53212
Waltz & Krenzer. 91 Willenbrock Rd., Oxford, CT 06478
CUTTING AND WELDING MACHINES
Bug-O-Systems. Inc., 3001 W Carson St. Pittsburgh, PA 15204
ESAB Cutting Systems. 411 South Ebenezer Road. Florence. SC 29501
DAMPERS
Geislinger Corporation, 200 Geislinger Drive.Battle Creek, MI 49015
DATA RECORDERS
L3 Communications. PO Box 3041 Sarasota FL 34230-3041
DECK MACHINERY — Cargo Handling Equipment
Coastal Marine Equipment. Bldg 9114 MISAAP Ind.Complex, Stennis Space Center,MS 39529
Edgewater Machine & Fabricators, P.O. Box 358. Edgewater, FL 32132-0358
Hatlapa Uetersener Maschinenfabrik Tornescher WEG 5-7 D-25436 Uetersen, Germany
Intercontinental Engineering, P.O. Box 9055. Kansas City, MO 64168
Lantec. 5827 Production Way. Langley. B.C. V3A 4N5 Canada
Markey Machinery. P.O.Box 24788. Seattle WA 98124
Rapp Hydema, 4433 27th Avenue West. Seattle WA 98199
Seabulk Sytems 3851 Shell Rd Ste 200 Richmond. BC Canada V6X-2W2
Skookum, Inc., P.O. Box 280, Hubbard. OR 97032
Smith Berger Marine Inc., 7915 10th Ave S. Seattle, WA 98108
Superior Lidgerwood-Mundy. 1101 John Ave. Superior. WI 54880
Timberland Equipment Ltd. & Almon Johnson. 459 Industrial Avenue. Woodstock, ON N4S7Z2 Canada
W.W. Patterson 3 Riversea Rd Pittsburg. PA 15233
DESALINATION - REVERSE OSMOSIS
G E T. Inc. 3135 Golden Avenue. Long Beach. CA 90806
Pall Rochem. 5775 Rio Vista Drive, Clearwater. FL33760-3114
Reverse Osmosis of South Florida. 12301 SW. 133 Court. Miami. FL. 33186
DESIGN CONSULTING
Fleet Technologies, 311 Legget Dr., Kanata. Ont, K2K 1Z8 Canada
DIESEL CYLINDER INDICATORS
Kiene Diesel, 325 S. Fairbanks St.. Addison IL 60101
DIESEL ENGINE — Spare Parts & Repair
Caterpillar. Inc, Engine Div.. P.O. Box 610, Mossville, IL 61552-0610
Cummins Marine, 4500 Leeds Ave.. Suite 301, Charleston, SC 29405
Deutz Canada Inc., 4420 Garand St., Montreal, Que. H4R 2A3
GE Marine Engines 1 Neuman Way Cincinnatti, OH 45215
Giro Engineering Limited, Talisman.Duncan Road,Park Gate.Southampton,Hants SO31 7GA England
Goltens Marine. 322 Broad Ave. Wilmington. CA 90744
H.P.International, Inc., 3812 W Linebaugh Ave. Tampa, Fl 33624
Industrial Estate, New Territories, HONG KONG
MAN B&W Diesel AG, Stadtbachstrasse 1. D-86153 Augsburg 1, GERMANY
MAN B&W Diesel A/S. Teglholmsgade 41. DK-2450 Copenhagen SV, DENMARK
MAN B&W Diesel. 17 State St. New York. NY 10004
Marine Exhaust Systems of Alabama, P.O. Box 698. 757Nichols Ave.. Fairhope. AL 36533
Marine Turbo & Diesel Inc 1090 7th St Richmond CA 94801
Mariso USA. Inc., 100 Davidson Ave., Somerset, NJ 08873
Motor-Service AB. Box 2115, S-144 04 Ronninge, SWEDEN
Motor Services Hugo Stamp. 3190 S.W. 4th Ave.. Ft. Lauderdale, FL 33315
NREC 1701 Engineers Rd Belle Chase LA 70037
Reagan Equipment, 2550 BelleChase Hwy., Gretna, LA 70054
Rolls -Royce Commercial Marine Houston 10255 Richmond Ave
Scardana Americas Bkg., 502 Empire St., Greefield Park, J4V1V7 Canada
Wartsila Diesel, 201 Defense Highway, Annapolis, MD 21401
DIESEL ENIGINE OVERHAUL
Goltens - NY Corp.. 160 Van Brunt St., Brooklyn, NY 11231
Governor Controls Systems 3190 W. 4th Ave Ft Lauderdale FL 33315
Marine Turbo & Diesel Inc 1090 7th St Richmond CA 94801
DIESEL FUEL DECONTAMINATION
(www.bunkerbuyer.com)
Algae X Intnl PO Box 4011 Ft Myers Beach, FL 33932
PRI 3750 Hacienda Blvd. Suite A Davie. FL 33314
DIGITAL TORQUE METER SYSTEMS
Instruments, Computers & Controls 78 Londonderry Tpke Hookset NH 03106
DISPLAY TECHNOLOGY
Kent Modular Electronics Ltd ,611 Maidstone Road. Rochester ME1 3QO
DIVING & SALVAGE
Bisso Marine Co P.O. Box 4113, New Orleans. LA 70178
H J. Merrihue. P.O. Box 23123. New Orleans LA 70183
DOCK FENDERING SYSTEMS
Plastic Pilings Inc., 1485 South Willow Ave, Rialto, CA 92376
DOORS - MARINE & INDUSTRIAL
Juniper Int'l.72-15 Metropolitan Ave. Middle Village. NY 11379
Manly Marine, PO Box 86788. N Vancouver B C Canada V7L 4L3
Mapeco. Inc. 90 Forest Ave., Locust Valley. NY 11560
Walz & Krenzer. 91 Willenbrock Rd., Unit B4. Oxford CT 06478
DRIVES
Allied Systems 2300 Oregon St Sherwood OR 97140
DRIVESHAFTS
The Cline Company. 600 Buncombe St.. Greenville. SC 29602
DRUG TEST KITS
Sun State Specialty K-9s. Inc ,1500 Beville Road, Daytona Beach. FL 32114
DRY DOCKS-Design
Crandall Dry Dock Engineers Inc., P.O. Box 505804, Chelsea. MA 02150
Heger Dry Dock Engineers. Inc., 13 Water St., Holliston. MA 01746
ELECTRICAL EQUIPMENT
Callenberg Equipment 2010 N Miami Ave. Miami, FL 33127
MMC International, 60 Inip Dr, Inwood NY 11096
ELECTRONIC INFORMATION SUPPORT
Scandinavian Micro Systems. P.O. Box 155, N-1411, Kolboton, NORWAY
Scientific Marine Svcs.. 101 State Pl., Ste P. Escondido. CA 92029
ELECTRICAL INSTRUMENTS
Selco USA. 2508 Lake Brook Ct., Atlanta. GA 30360
ELECTRONIC CHARTS
C-Map Commercial 133 Falmouth Rd., Mashpee. MA 02649Marine Electronics
NOAA Office of Coast Survey. 1315 East-West Hwy.,Silverspring, MD 20910
Solutions. 1522 Crabapple Cove. Jacksonville. FL 32225
ELECTRONICS
C-MAP. P. O Box 212, 4371 Egersund Norway
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Sure Seal Connections, 3951 South Plaza Dr. Suite 240, Santa Ana, CA 92704
Standard Horizon, 10900 Walker St., Cypress, CA 90630
EMPLOYMENT
All American Marine P O Drawer 191237 Tillman's Corner. AL 33619
Military Sealift Command PO Box 120 Code APM-124 Virginia Beach.VA 23458-0120
Peter D. Juan ESQ, 14 Lafayette Court, Greenwich Ct 06830
ENGINEERING SERVICES / MARINE ENGS
Callenberg Equipment 2010 N. Miami Ave. Miami. FL 33127
Scientific Marine Services, Inc., 101 State Pl., Suite F. Escondido. CA 92029
U.S.M.M.A., 300 Steamboat Rd. Kings Point, NY 11024
ENGINE ROOM LIGHTING/MONITORING & CONTROL
GMT Electronics, 171 Main Street. South River. NJ 08882
Mackay Communications. 2721 Discovery Dr., Raleigh, N.C. 27616-1851
ENGINE ROOM REPLACEMENT PARTS
Mansco USA. Inc., 100 Davidson Ave, Sommerset, NJ 08873
ENGINES
GE Marine Engines, 1 Neuman Way, Cincinnati, OH 45215
Wartsila NSD Corporation. box 252, Vasa, finland Fin-65101
EQUIPMENT RELIABILITY ANALYSIS SOFTWARE
Resurgence Software Inc.. Advanced Technology Center, 2021 Lakeshore Drive, Suite 21D. New Orleans, LA 70122
EVACUATION SYSTEMS
DBC. 12351 Bridgeport Rd., Richmond, BC Canada
Fleet Technology 311 Legget Dr Kanata Ontario K2K 1Z8
EVAPORATORS
Alfa-Laval Separation, Inc., 955 Mearns Rd.. Warminster, PA 18974
Sasakura Engineering. 7-32 Takeshima. 4-chome. Nishiyodogoaw. KY. Osaka555, Japan
EQUIPMENT DISTRIBUTOR
Total Marine Solutions 4350 Oaks Rd, Ste 501, Ft Lauderdale FL 33314
EXPANSION JOINTS
Elasto Valve Rubber Products 1691 Pioneer Rd Sudbury ONTARIO Canada P3G 1B2
Silex Inc 6659 Ordan Dr Mississauga, ON CANADA L5T 1K6
EXTRUDED RUBBER PRODUCTS
Clean Seal Inc., P.O. Box 2919, South Bend, IN 46880
FAIRING COMPOUND
Philadelphia Resins, P.O B 309. Montgomeryville, PA 18936
FANS - VENTILATORS - BLOWERS
Jon M Liss Associates, Inc.. 411 Borel Ave., San Mateo, CA 94402
FASTENERS
Jamestown Distributors, P.O. Box 348, Jamestown, RI 02835
Superbolt, P.O.B. 683, Carnegie, PA 15106
FENDERING SYSTEMS/BUOYS - Dock & Vessel
Dolphin USA 2241 Barraud Ave Norfolk, VA 23504
Duramax Marine LLC 17990 Great Lakes Parkway, Hiram,OH 44234
Kahlenberg Bros. Co., P.O Box 358, Two Rivers, WI 54241
Maritime International, 100 E. Vermilion Street #212, Lafayette. LA 70501
Plastic Pilings Inc., 1485 South Willow Ave., Rialto, CA 92376
Poly-Hi-Solidur, 2710 American Way, Ft. Wayne. IN 46899
Schuyler Rubber Co.. 16901 Woodred Rd., Woodinville. WA 98072
Seaward Int'lP.O. Box 98, Clearbrook, VA 22624
Urethane Products 9076 Rosecrans Ave Bellflower, CA 90706
Viking Fender Co., 1160 State St., Perth Amboy, NJ 08861
FILTERS/FILTER SYSTEMS
(www.bunkerbuyer.com)
Algae X Int'l, PO Box 4011, Ft. Myers Beach, FL 33932
Boll Filter, 15 International Drive, East Granby, CT 06026
G.E.T., Inc., 3135 Golden Avenue. Long Beach, CA 90806
Hellan Strainer 3249 East 80th St Cleveland, OH 44104
FIRE & SAFETY PRODUCTS
Brookdale International, 1-8755 Ash St., Vancouver BC. V6P6T3
DBC Marine Safety Systems, 101-3760 Jacombs Rd. Richmond. BC, Canada V6V1Y6
Fr.Fassmer &Co. D-27804 Berne/Motzen, Germany, IndustriestraBe2
IFSTA/Fire Service Programs, 9030 N. Willis, Stillwater, OK 74078-8045
IMSSCO Corporation, 2040 Harbor Island Drive, Suite 201 A, San Diego,CA 92101
Port Canaveral Marine Fire Fighter Academy, Canaveral Port Authority, P.O. Box 267, Cape Canaveral, FL 32920
FLANGES
Jesse Engineering, 5225 7th St. E Tacoma, WA 98424
FLOW CONTROLS
Hoffer Flow Controls 107 Kitty Hawk Lane, Elizabeth City, NC 27906
FLUID SEALING AND PACKING
The Delamar Company, Highway 60 Rte 4, Dillwyn, VA 23436
FUEL ADDITIVES
Power Research Inc 3750 Hacienda Blvd Ste A, Davie, FL 33314
FUEL DECONTAMINATION
(www.bunkerbuyer.com)
Algae X Int'l, PO Box 4011, Ft. Myers Beach, FL 33932
FUEL TREATMENTS
Power Research Inc 3750 Hacienda Blvd Ste A. Davie, FL 33314
FULL SERVICE SHIPYARD & REPAIR
Mansco, Ltd. 91-607 Malakole Rd Kapolei, HI 96707-1831
GALLEY EQUIPMENT
Cospolich Refrigerator Co.,PO Box 1206 Destrehan LA 70047
Dutchess Baker's Machinery Co., 1101 John Ave, Superior WI 54880
Jamestown Metal Marine Sales, Inc., 4710 Northwest Second Ave, Boca Raton, FL 33431
Lang Manufacturing Co., 6500 Merrill Creek Pkwy, Everett, WA 98023
GANGING & SAMPLING
Hermatic Inc., 4522 Center St., Deerpark, TX 77536
GAS TURBINES
GE Marine Engines 1 Neuman Way Cincinnatti. OH 45215
GEARS & GEAR REPAIR
Goltens - New York Corp., 160 Van Brunt St., Brooklyn, NY 11231
Karl Senner Inc., 25 W Third, Kenner LA 70062
The Falk Corp., PO Box 492, Milwaukee, WI 53201-0492
GENERATOR CONTROLS
Con-Select Inc PO Box 8745 Mandville. LA 70471
Selco USA, Inc.,2508 Lake Brook CT. Atlanta, GA 30360
GMDSS — GEAR BOXES & BEARINGS
Beier Radio. 1990 Industrial Ave Harvey. LA 70058
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Renk AG. Goegginger Street 73. 86159 Augsberg, Germany
GOVERNORS
Motor Services Hugo Stamp, 3190 S.W. 4th Ave, Ft. Lauderdale, FL 33315
GPS
Leica Navigation 23868 Hawthorne Blvd Torrance CA 90505-5908
Standard Horizon, 10900 Walker St., Cypress, CA 90630
GROUNDINGS
Sohre Turbomachinery 132 Gilbertville Rd PO Box 889 Ware. Mass 01082-0889
HATCHES AND DOORS
Juniper Int'l.,72-15 Metropolitan Ave., Middle Village, NY 11379
Manly Marine. P.O. Box 86788, N. Vancouver, BC V7L 4L3 Canada
HEAT EXCHANGERS
Alfa-Laval Separation Inc.. 955 Mearns Rd., Warminster, PA 18974
Duramax Marine LLC 17990 Great Lakes Parkway Hiram,OH 44234
Tranter, Inc., P.O. Box 2289, Wichita Falls, TX 76307
HEAVY FUEL TREATMENT
Algae X Int'l, PO Box 4011, Ft. Myers Beach, FL 33932
HIGH SPEED FERRY BUILDERS
Incat Australia (Pty) Ltd.,18 Bender Drive, Hobart 7009, Australia
HOISTS
Coastal Marine Equipment, Bldg 9114 MISAAP Ind.Complex, Stennis Space Center,MS 39529
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
Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062
HOSES/HOSE FITTINGS
JGB Enterprises, Inc. 115 Metropolitan Drive, Liverpool, NY 13088
HYDRAULIC SYSTEMS
Allied Systems 2300 Oregon St, Sherwood OR 97140
Cunningham Marine Hydraulics 201 Harrison St, Hoboken NJ 07030
Offshore Inland 3521 Brookdale Dr.S. Mobile AL 36618
IMO PUBLISHING
4 Albert Embankment, London SEI 7SR, UK
INDUSTRIAL SAFETY
Stearns Manufacturing, PO Box 1498, St Cloud, MN 56302-1498
INSURANCE SERVICES
WQIS, 80 Broad St. 21st Flr., New York, NY 10004
INCINERATORS
Therm-Tec Inc., PO Box 1105, Tualatin, OR 97062
INFLATABLES
Willard Marine. 1250 Grove St., Anaheim, CA 98286
INSPECTION EQUIPMENT
Staveley Instrument, 421 N.Quay St.,Kennewick, WA 99336
INSTRUMENTATION
Hoffer Flow Controls, 107 Kitty Hawk La., Eizabeth City, NC 27906
Thermo Electron, 6801 Cochran Rd., Solon, OH 44139
INSULATION
Lit Industries, 516 Costner School Rd.,Bessemer City, NC 28016-9801
Mascoat Products, 10890 Alcott, Unit 102, Houston, TX 77043
Pacor, Inc., P.O. Box 107, Westville, NJ 08093
Shannon Enterprises of WNY Inc., 162 Sweeny St., North Tonawanda, NY
Superior Energies Inc., 3115 Main Avenue, Groves TX 77619
INTERIORS
Custom Ship Interiors, Inc., P.O. Box 882, Solomons, MD 20688
Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980
Insulations, Inc., Rt. 5, 12360 Leisure Rd, Baton Rouge, LA 70807
Jamestown Metal Marine 4710 NW 2nd Ave., Boca Raton, Fla. 33431-4870
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031
JOINER—Watertight Door—Paneling—
Ceiling System—Decking
Custom Ship Interiors, Inc. P.O. Box 882, Solomons MD 20688
Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031
Panel Specialists, Inc./Thermax, 3115 Range Rd.. Temple, TX 76501
Walz & Krenzer, 91 Willenbrock Rd., Unit B4, Oxford CT 06478
K-9 DETECTION
Sun State Specialty K-9s, Inc.,1500 Beville Road, Daytona Beach, FL 32114
KEEL COOLERS
Duramax Marine LLC 17990 Great Lakes Parkway, Hiram,OH 44234
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
The Walter Machine Co., Inc.. 84-98 Cambridge Avenue. Jersey City, NJ 07307
LASER ALIGNMENT
Boland Industrial & Consulting Services, P.O.B. 91360, Mobile, AL 36691
LUDECA 1425 NW 88th Ave Miami FL 33172
LAUNDRY EQUIPMENT
Richard Galley Supply, PO Drawer 4035, Houma, LA 70361
LEAK REPAIR
Indumar Products Inc 2500 Tanglewilde, Suite 260, Houston TX 77063
LIFEBOATS/RAFTS
DBC Marine Safety Systems, 101-3760 Jacombs Rd. Richmond, BC, Canada V6V1Y6
Edgewater Machine & Fabricators, P.O. Box 358, Edgewater, FL 32132-0358
Fassmer & Co.D-27804 Berne/Motzen, Germany, IndustriestraBe2 v
Norsafe AS, P.O. Box 115, N-4818 Faervik, Norway
Viking Life Saving Equipment, 1625 N. Miami Ave., Miami, FL 33136
Willard Marine Co., Inc., 1250 N. Grove St., Anaheim, CA 92806
Wolong International, 151 Chin Swee Road #03-14, Manhattan House, Singapore 169876
LIFEBOAT SERVICING
Technofibre Pte.Ltd., 51 Shipyard Road. Singapore 628139
LIFEBOAT TESTING
Water Weights, Inc., 5139 Brook St., Suite E, Mont Claire, CA 91763
LIFESAVING EQUIPMENT
Viking Life Saving Equipment. 1625 N. Miami Ave.. Miami, FL 33136
LIFT EQUIPMENT
Mi-Jack Products, 3111 West 167th Street, Hazel Crest, IL 60429
LIFT EQUIPMENT TESTING
Water Weights Inc., 5139 Brooks St., Suite E, Montclair, CA 91763
LIGHTING SYSTEMS / EQUIPMENT
ACR Electronics, Inc., 5757 Ravenswood Rd.. Ft. Lauderdale, FL 33310-5247
Archway Marine, 4501 Swan Ave., St. Louis, MO 63110
Goltens Marine, 160 Van Brunt St.. Brooklyn, NY 11231
Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062
L.C. Doane, P.O.Box 975, Essex CT 06426
Pauluhn Electric Mfg. Co., Inc. P.O. Box 53, Pearland, TX 77588
LINE & NET CUTTERS
Spurs Marine, 201 SW 33rd St., Ft. Lauderdale, FL 33315
LIQUID OVERFILL PROTECTION SYSTEMS
King Engineering Corp., P.O. Box 1228, Ann Arbor, MI 48106
LOAD MEASURING EQUIPMENT
Water Weights Inc. 5139 Brook St Ste E Mont Claire, CA 91763
LOAD TESTING
Water Weights Inc. 5139 Brook St Ste E Mont Claire, CA 91763
LUBRICANTS/LUBRICATION SYSTEMS
Benjamin R. Vickers & Sons Ltd., Airedale Mills, 6 Clarence Road, Leeds, W.Yorkshire England, UK L510 IND
Companion Products, Inc., 2040 Johnson Ct. Unit A, Kingston, IL 60145-0009
MACHINERY MAINTENANCE, REPAIR AND TESTING
Goltens - New York Corp., 160 Van Brunt St., Brooklyn.NY 11231
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27604-1851
MANAGEMENT SYSTEMS & SERVICE
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
PCS Marine, 174 Colonnade Road S., Nepean, Ontario K2E715
MARINE CONSULTANTS
Boland Industrial & Consulting Services, P.O.B. 91360, Mobile, AL 36691
Hall Associates of Washington, Inc., P.O. Box 1554. Mukilteo, WA 98275
PCS Marine, 174 Colonnade Road S., Nepean, Ontario K2E715
MARINE CONSTRUCTION/REPAIR
Sundial Marine, 5605 N.E. Sundial Road, Trautdale, OR 97060

MARINE CRANES
Liebherr-Werk Nenzing GMBH, P.O. Box A6710, Nenzing, Austria
MARINE DECKING & FLOORING
Flexible Decking, 2708 N. Australian Ave. Ste. 9, West Palm Beach, FL 33407
Hopeman Brothers. Inc., P.O. Box 820, Waynesboro, VA 22980
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Slipnot Safety Flooring WS Molnar Co. 2545 Beavfait St., Detroit, MI48207
MARINE ELECTRONICS
ACR Electronics, Inc., 5757 Ravenswood Rd., P.O. Box 5247,
Ft. Lauderdale, FL 33310-5247
Beier Radio, 1990 Industrial Ave Harvey. LA 70058
Callenberg Engineering 2010 N. Miami Ave, Miami, FL 33127
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
GMT Electronics, 171 Main Street. South River, NJ 08882
Hatteland Display, Bogstadveien 19, N-0355 Oslo, Norway
JRC, 1011 SW Klickitalway Bldg B, Suite 100, Seattle WA 98134
Jotron Electronics. Box 85, NO-3280TJODALYNG, Norge
Kockum Sonics, Inc.. 933 Industry Rd., Ste105, Kenner, LA 70062
Leica Navigation, 23868 Hawthorne Blvd., Torrance CA 90505-5908
Marine Electronic Solutions, 1522 Crabapple Cove, Jacksonville, FL 32225
Raytheon Marine GmbH, High Seas Products, Postfach 1166
D-24100 Kiel, Germany
(Distributor for Raytheon) Klein Navigation, 11 Klein Drive, Salem NH 03079
Saab Marine Electronics AB. Box 13045, 402 5Goteborg,SWEDEN
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolboton,NORWAY
Scientific Marine Services, Inc., 101 State Pl., Suite F,Escondido, CA 92029
Standard Horizon, 10900 Walker St., Cypress, CA 90630
MARINE ENGINEERING
Elliot Bay Design Group, 5301 Shilshole Ave. NW, Ste. 200, Seattle, WA 98107
MARINE EQUIPMENT
Baltic Spare Services Ltd 8 Astronodomow St., 80-299 Gdansk,Poland
Commercial & Marine Products, 3924 Forest Dr., #11, Columbia,SC 29204
Plastic Pilings Inc., 1485 South Willow Ave., Rialto. CA 92376
Scardana Americas Bkg., 502 Empire St., Montreal, Greenfield Park, j4v1v7
Superior Lidgerwood-Mundy, 1101 John Ave., Superior, WI 54880
Waterman Supply, P.O.Box 596, Wilmington, CA 90748
MARINE HARDWARE
HMS Marine Hardware, 333 W.Merrick Road, Valley Stream, NY 11580-5219
MARINE RADIOS
Standard Horizon, 10900 Walker St., Cypress, CA 90630
MARINE SERVICES
Conam Inspection, 192 International Blvd., Glendale Heights, IL 60139
MARINE THERMAL IMAGER
Arion International 720 Glen Eagle Drive #100 Winter Springs, FL 32708
MARITIME TRAINING & SCHOOLS
Marine Safety Int'l., Marine Terminal Laguardia Airport, NY 11371
METAL ALLOY DISTRIBUTORS
Diversified Metals 49 Main St Monson, MA 01057
METERS
Selco USA, 2508 Lakebrook Ct., Atlanta, GA 30360
MONITORING SYSTEMS
GR Bowler 2261 Lake Rd Ontario, NY 14519
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851
Prime Mover Controls, 3600 Gilmore Way, Burnaby BC V5G 4R8 Canada
MOORING LINES
Bayer Faser Building F18 DV Marktg Monofil 41538 Dormagen, Germany
MOORAGE FACILITY
Sea Ark Marine, PO Box 210, Monticell.o AR 71655-0210
Washington North Tongue Point 1300 Dexter Ave., N. Ste 205 Seattle. WA 9810
MOTOR PROTECTION
Marine Safe Electronics, 261 Millway Ave. #12, Concord Ontario L4K 4K9
MOUNTING SYSTEMS
Machine Support 1932 Mill Pond Dr Chesapeake, VA 23320
NAVAL ARCHITECTS, MARINE ENGINEERS
A.K. Suda, Inc.. 3004 19th St., Metairie. LA 70002-4989
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
Band. Lavis, & Associates, 900 Ritchie Hwy. Suite 203. Severna Park. MD 21146
Bay Engineering. 253 N. First Ave.. Sturgeon Bay. WI 54235
C. Baxter & Associates, P.O. Box 9006, Mobile, AL 36609
CDI Marine Co., 9550 Regency Square Blvd. Ste. 400, Jacksonville, FL 3222
Computer Sciences Corporation-Advance Marine Center, 1201 M St. SE.
Washington, DC 20003
CT Marine, 56 Crooked Trail, Rowayton, CT 06853
Cunningham & Walker, 1762 Providence Hollow Lane, Jacksonville, FL 32223
DeJong & Lebet, Inc., 1734 Emerson Street, Jacksonville, FL 32207
Designers & Planners, 2120 Washington Blvd. Ste.200, Arlington, VA 22204
Elliot Bay Design Group 5301 Shishole Ave NW Ste 200 Seattle WA 98107
Fleet Technology, 311 Legget Dr.. Karata, Ontario, Canada K2K 1Z8
George G. Sharp, Inc., 100 Church St., New York, NY 10007
Guido Perla & Assoc., 720 3rd Ave.. Ste. 1200, Seattle, WA 98104
James S. Krogen. 799 Brickelli Plaza Ste. 701, Miami, FL 33131
Jamestown Marine Service, Marine Science & Tech Center 1084 Shennecossett Rd
Groton, CT 06340
John J. McMullen Associates, Inc., 4300 King St., Suite 400, Alexander, VA 22302
John W. Gilbert & Assoc.. Inc., 199 State St., Boston, MA 02109
Kvaerner Masa Marine Inc., 201 Defense Highway, Suite 202, Annapolis, MD 21401
M. Rosenblatt & Son, Inc., 2341 Jefferson Davis Hwy, Arlington, VA 22202
Maritech, Seacliff, Bay Road, Newmarket, NH 03857
Maritime Design, 13000 Sawgrass Village Circle, Ponte Vedra Beach. FL 32082
MCA Engineers, Inc., 2960 Airway Ave., #A-103, Costa Mesa, CA 92626
McElroy Machine & Mfg Co., Inc.. P.O. Box 4454, Biloxi, MS 39535-4454
MH Systems 10951 Sorrento Valley Rd#2FSan Diego CA 92121
MIL Systems, 200-1150 Morrison Drive, Ottawa, Ontario K2H 8S9
Nautical Designs. Inc. 2101 S. Andrews Ave,Suite 202, Fort Lauderdale FL 33316
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
R.J. Mellusi & Co., 71 Hudson St, New York, NY 10013
Sargent & Herkes. 225 Baronne St., Suite 1405, New Orleans LA 70112
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
Sea School, 10812 Gandy Blvd, St. Petersburg, FL 33702
Seaworthy Systems Inc. P.O. Box 965, Essex, CT 06426;
The Glosten Assoc. Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle. WA 98104
TIMSCO, P. O. Box 91360, Mobile AL 36691
Washburn Doughty, P.O. Box 296, E. Boothbay, ME 04544
NAV/COMM EQUIPMENT
Beier Radio 1990 Industrial Ave, Harvey LA 70058
C-Map/Commercial, 133 Falmouth Rd., Mashpee, MA 02649
C-Map. P.O. Box 212 4371 Egersund Norway
St. Johns, Newfoundland, Canada A1A 2GB
Charlco, New North Road, Hainault, Ilford Essex, 166 2UR England,UK
Electronic Marine Systems, 800 Ferndale Pl., Rahway. N.J. 07065
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Mackay Communications, 3691 Trust Dr., Raleigh, NC 27616
Scandinavian Micro Systems P.O. Box 155, N-1411, Kolboton. NORWAY
Standard Communications. P.O. Box 92151, Los Angeles, CA 90009
Transas Marine USA, 19105 36th Ave. W. St. 101, Linwood, WA8036
NAVIGATION
Comnav Marine Ltd.,#15-13511 Crestwood Pl., Richmond, BC V6V2G1
D&B Technologies, 1400 S.Orland Ave., Winter Park, FL 32789
Kongsberg Maritime Ship Systems AS, PO Box 1009 3194, Horten. Norway
Nauticast AG. Mariahilfer Strasse 50/2/11.A-1070 Vienna, Austria
Transas Marine USA 19105 36th Ave West Ste 101 Lynwood, WA 98036
NOZZLES/NOZZLE SYSTEMS
Harrington Marine. 6720 124th Ave., Fennville, MI 49408
NautiCAN Research and Develop..P.O. Box 428-115 Kelvin Grove Way, Lions
Bay,BC V0N 2E0
OFFSHORE MARINE CONSTRUCTION
Amfels 5177 Richmond Ave Ste 1065 Houston TX 77056
OFFSHORE TOWING
Tidewater. 601 Poydras Street. New Orleans. LA 70130
OIL/WATER SEPARATORS
Alfa-Laval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974-0556
MMC International. 60 Inip Dr, Inwood NY 11096
Sasakura Engineering. 7-32 Takeshima, 4-chomNishiyodogoaw.KY. Osaka555,
Japan
PAINTS/ANTI-FOULANTS
Jotun Paints Inc. 1401 Severn St., Baltimore,MD 21230
Sigma USA, PO Box 816, Harvey, LA 70059
Wasser High Tech Coatings. 8041 South 228th St., Kent, WA 98032
PAINT REMOVAL
Ultra Strip Systems 3515 SE Lionel Terrace Stuart, FL 34996
PARTS LOCATOR SERVICE
Inventory Locator Service 3965 Mendenhall Rd. Memphis, TN 38115
PFD's (Personal Flotation Devices)
Stearn's Mfg Co. PO Box 1498 St Cloud, MN 56302-1498
PIPE FITTINGS/CUTTINGS/CONNECTING/ SYSTEMS
GS-Hydro U.S., 1395 Bluehills Ave.,Bloomfield CT. 06002
Jesse Engineering, 5225 7th St. East., Tacoma, WA 8424
Neptune Research, 1685 Latham Rd., West Palm Beach. Fl 33409
Norma Products (U.S.) Inc. 31132
Century Drive, Wixmon, MI 48393
PIPE LEAK REPAIR
CSD North America 88o Canada Rd, Manchester, NH 03109
POLLUTION CONTROL PRODUCTS
Enecon Corporation, 125 Baylis Rd., Melville, NY 11747-3800
PORTABLE FOAM APPLICATORS
IMSSCO Corporation, 2040 Harbor Island Drive, Suite 201 A, San Diego,CA 92101
PORTABLE VENTILATORS
Americ Corp 1910 E. Devon Ave Elk Grove Village, IL 60007
PORT DEVELOPMENT
RTM Star Center, 2 W.Dixie Hwy., Dania, FL 33004
Sasakura Engineering, 7-32 Takeshima.4-chome.Nishiyodogoaw.KY. Osaka555, Japan
PORT SECURITY
Foss Environmental, P.O. Box 3535, Seattle, WA.98124
PRECISION FLAME CUTTING/SAWING
Ronson Technical. 2146 B Flintstone Dr., Tucker. GA 30085
PRESSURE INDICATORS
Lehman & Michaels GmbH & Co. kg.
Marlow Ring 4, D-22525 Hamburg Germany
PREVENTATIVE MAINTENANCE
Marine Safe Electronics 37 Staffern Dr Concord Ontario L4k 242
PROPULSION EQUIPMENT
ABB Drives Inc., P.O. Box 372, Milwaukee, WI 53201-0372,
ABB Industry Oy, P.O. Box 185, 00381 Helsinki, FINLAND
ABB TURBOCHARGER, INC.,1460 Livingston Avenue, North Brunswick, NJ 08902
AlstomPower Conversion, 3 Ave Des Trois Chenes 90018 Belfort Cedex France
Brunvoll A/S, P.O. Box 370, N-6401, Molde, Norway
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320
Centa Corp., 8185 Cass Ave., Darien, IL 60561
Cummins Marine, 4500 Leeds Ave., Suite 301, Charleston, SC 29405
Fincantieri, Diesel Engines Div—GMT, Bagnoli della Rosandra 3334, Trieste, ITALY
Geislinger Corporation, 200 Geislinger Drive,Battle Creek. MI 49015
Goltens Worldwide, 160 VanBrunt St., Brooklyn, NY 11231
Harbormaster Marine Inc., 31777 Industrial Rd., Livonia, MI 48150
Harrington Marine, 6720 124th Ave.,Fennville. MI 49408
Jan Verhaar Omega Thrusters 2340 AC Oegstgeest Holland
Jan Verhaar Omega Thrusters, P.O. Box 119, 2340 AC Oegstgeest, NETHERLANDS
Karl Senner Inc., 25 W Third, Kenner LA 70062
KawasakiHeavy Industries, Ltd., World Trade Center Bldg..4-1 Hamamatsu-cho,2-chome,Minato-ku,Toyko 105-6116, Japan
Konrad 1421 Hanley Rd Hudson WI 54016-9376
LA.ME.srl, Marine Division, Via Della Fomace 4, Opera (MI) Italy
MAN B&W Diesel, 17 State St., New York, NY 10004
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Holeby, DENMARK
MAN B&W Diesel A/S. Alpha Diesel, Niels Juels Vej 15. DK-9900 Frederikshavn,
DENMARK
MAN B&W Diesel GmbH. Stadtbachstrasse 1, D-86153 Augsburg 1 GERMANY
Mapeco, Inc., 91 Willenbrock Rd., Unit B4, Oxford CT 06478
Markisches Werk, P.O. Box 1442, D-5884 Halver GERMANY
Napier Turbochargers, PO Box 1, Waterside South Lincoln LN5 7FD England
Omnithruster Inc., 30555 Solon Ind. Pkwy., Cleveland. OH. 44139
Orion Corp., 1111 Cedar Creek Rd., Grafton, WI 53024
Propulsion Systems Inc 601 NE 26th Court, Pompano Beach, FL 33064
Rolls -Royce Commercial Marine Houston 10255 Richmond Ave
Ste 101 Houston TX 77042
Schottel Inc., 675 Industrial Blvd., Sugar Land, TX 77478
Schottel Gmbh & Co, KG-Mainzer Strasse 99-D-56322-Spay GERMANY
Schottel-Werft, Manizer Strasse 99, D-56322 Spay/Rhein, GERMANY
Siemens Electric Ltd. 1180 Courtney Park Rd, Mississauga, Ontario Canada
The Falk Corp.. PO Box 492. Milwaukee. WI 53201-0492
Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck. NY 11021
Voith Schiffstechnik GMBH & Co., PO Box 2011, 89510 Heidenheim Germany
Wartsila Lips, 3617 Koppens Way, Chesapeake. VA.,23323
ZF Marine Group 3131 SW 42nd St.. Ft. Lauderdale. FL 3331
ZF Marine Group, Ehlerstr.50. 88046 Friedrichshafen, Germany
PUMP—Repair—Drives
Advanced Environmental Systems, 2 Sutton Rd.. Webster. MA 01570
Fybroc-Div.of Met-Pro, PO Box 144, Harleysville, PA 19438
Reagan Equipment, 2550 BelleChase Hwy.,Gretna LA 70054
Scardana Americas Bkg., 502 Empire St., Greefield Park. J4V1V7 Canada
RADIATION DETECTION
Thermo Electron, 6801 Cochran Rd., Solon, OH 44139
RADARS —ARPAS
Ampco Pumps Co..4424 West Mitchell St., Milwaukee WI 53214
Beier Radio 1990 Industrial Ave., Harvey, LA 70058
Furuno USA, Inc.. 4400 NW Pacific Rim Blvd., Camas. WA 98607
Kelvin Hughes Ltd New North Rd Hainavlt, Ilford Essex 1G6 2UR
REMOTELY OPERATED VEHICLES
VideoRay LLC, 415 Engleview Blvd.. Exton, PA 19341
REVERSE OSMOSIS
GET Inc 3135 Golden Ave LongBeachCA
RH PROPULSION
Goltens. 160 Van Brunt St.. Brooklyn. NY 11231
RIGID INFLATABLE BOATS
Willard Marine, Inc. 1250 N. Grove St., Anaheim, CA 92806
ROPE—Manila—Nylon—Hawsers—Fibers
Cortland Cable Co., 44 River St.(PSR), Cortland, NY 13045-0330
Marlow Ropes, South Road. Hailsham, E. Sussex, BN27335
Pelican Rope Works. 4001 W.Cariage Way,Santa Ana,CA 92704
Puget Sound Rope. 1012 Second St., Anacortes, WA 98221
ROTATING EQUIPMENT
FCS. Inc., 22 Main Street, Centerbrook. CT 06409
RUDDER BEARINGS & BUSHES
Duramax Marine, 16025 Johnson St., P.O Box 67,
Middlefield, OH 44062-006
Orkot Composites., 2535 Prairie Rd.. Unit D, Eugene, OR 97402
Thordon Bearings. Inc., 3225 Mainway. Burlington. Ontario L7M 1A6
SAFETY & ENVIRONMENTAL SOLUTIONS
Total Marine Solutions 4350 Oaks Rd. Ste 501, Fort Lauderdale, FL 33314
SAFETY MANAGEMENT CONSULTANTS
Modern Maritime 67 Bow Street. Ste. 3, Portsmouth, NH 03801
SAFETY PRODUCTS
Brookdale International, 1-8755 Ash St., Vancouver BC. V6P6T3
D&B Technologies, 1400 S.Orland Ave., Winter Park, FL 32789
DBC Marine Safety 101 3760 Jacombs Rd Richmond
BC V6V146
Fab En Co, Inc 2012 Karbach Houston, TX 77092
Lalizas SA. 21 Haidariou St., 545 Piraeus,Greece
Liferaft Systems of Australia 5 Sunmont St Derwent Park
Tasmania, Australia 7009
Walport"WUSA"39-5A Dover Rd SouthToms River NJ 08757
L3 Communications PO Box 3041 Sarasota FL 34320-3041
N.Vancower, Bc Canada VZP 3n4
Norwegian Maritime Equip. AS. Box 244, NO-5460 Husnes. Norway
Slipnot Safety Flooring WS Molnar Co. 2545 Beavfait St Detroit. MI 48207
Stearns Mfg Co PO Box 1498 St Cloud, GA 56302-1498
Viking Life Saving. 1625 N. Miami Ave., Miami, FL 3313
SANITATION DEVICE—Pollution Control
Envirovac Inc.. 1260 Turret Dr., Rockford, IL 61111
Headhunter Inc.,4100 Ravenswood Road, Ft. Lauderdale, FL 33312
Hydroxyl systems Inc.. 9800 McDonald Park Road. Sidney. BC V8L 3S8
Microphor, 452 E. Hill Rd.. Willits, CA 95490
Sanitary For All, 3909 Witmer Road. PMB 472. Niagara Falls. NY, 14305
SATELLITE COMMUNICATIONS
Beier Radio 1990 Industrial Ave, Harvey,LA 70058
Comsat Maritime Services. 6560 Rock Spring Dr Bethesda MD 20817-1146
Furuno USA, Inc.. 4400 N.W. Pacific Rim Blvd. Camas WA 98607
KVH Industries Inc., 50 Enterprise Center. Middletown. RI 02842
Land Sea Systems. 509 Viking Drive .Suite KLM, Virginia Beach. VA 23452
Mackay Communications, 3691 Trust Dr., Raleigh, N.C. 27616
Nera Satcom AS. Box 91. NO-1375 Billingstad. Norway
Norwegian Telecom, Postboks 6701 St. Olivs Plass, N-0130, Oslo. Norway
Stratos, 1501 Metcalfe St., Suite 1900. Ottawa, Ontario K2P 1P1 Canada
SCARIFIERS
Desmond-Stephan, P.O.B. 30, Urbana, OH 43078
SEALS
Circle Seal Controls Inc., 2301 Wardlow Circle. P.O. Box 3300 Corona. CA
Duramax Marine, 16025 Johnson St., Middlefield, OH 44062
Orkot Inc., 2535 Prairie Rd., Unit D, Eugene, OR 97402
Sure Seal Connections, 3951 South Plaza Dr. Suite 240, Santa Ana. CA 92704
SEATING
H.O. Bostrom 818 Progress Ave Wankesha, WI 53186
SELF UNLOADING SYSTEMS
Seabulk Systems 3851 Shell Rd Ste 200 Richmond CANADA V6X 2W2
SENSORS
Electronic Marine Systems, 800 Ferndale Pl., Rahway, N.J. 07065
SHAFT HORSEPOWER MEASURING SYSTEM
Instruments, Computers & Controls 78 Londonderry Tpke Hookset NH 03106
SHAFT SEALS
Duramax Marine LLC 17990 Great Lakes Parkway, Hiram,OH 44234
SHAFTS
American Vulkan. 2525 Dundee Rd.. Winter Haven, FL 33884
Geislinger Corporation. 200 Geislinger Drive.Battle Creek. MI 49015
SHIP LIFTS
Synchrolift Inc.. Two Datran Center. 9130 S. Dadeland Blvd.. Miami, FL 33156-7850
SHIP MANAGEMENT
Eurasia Group, 22A Floor Chinachem Exchange Sq., 1 Hoi Wan St., Quarry Bay
Hong Kong
SHIPBOARD HUMAN RESOURCES
PO 101073 Ft Lauderdale, FL 33310
SHIPBOARD TESTING
Dayton T. Brown, 555 Church St., Bohemia. NY 11716
SHIPBUILDING—Repairs, Maintenance, Drydocking
Allen Marine PO Box 1049 Sitka, AK 99835
Astilleros Espanoles, S..A. Ochandiano, 14-16 28023 El Plantio SPAIN
Atlantic Marine, Inc.,P.O. Box 3202, Mobile, AL 36652
Atlantic Marine, Inc., 8500 Heckscher Dr., Jacksonville, FL 32226
Atlas Metal Sales, 1401 Umatilla St., Denver CO 80204
Austal USA 100 Dunlap Dr Mobile AL 36602 USA or PO Box 1049.
Mobile, AL 36633
Bender Shipbuilding & Repair. P.O. Box 42, Mobile AL 36601
Bisso Marine Co.. P.O.Box 4113. New Orleans, LA 70178
Blount Marine, 461 Water St., Warren, R.I. 02885
Bollinger Lockport & Larose, P.O. Box 250, Lockport. LA 70374
Curacao Drydock Co.,Box 3012, Willemstad, Curacao, Netherlands Antilles
Cascade General Inc., 5555 N. Channel Ave.. Bld. 71, Portland.OR 97217
Detyens Shipyards Inc.,1670 Drydock Ave., Bldg 236 North Charleston,SC
29450
Eastern Shipbuilding Group, 2200 Nelson Street, Panama City, FL 32402
Fincantieri Spa Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
Friede Goldman Halter, 525 E. Capitol Street. Suite 402, Jackson. MS39201
Gladding Hearn,1 Riverside Ave., Somerset, MA 02725
Goltens - New York Corp., 160 Van Brunt St., Brooklyn, NY 11231
Halter Marine Group, Inc.. 13085 Industrial Seaway Rd. Gulfport. MS 39503
Hike MetalBox 698, Wheatley, ON Canada N0P 2P0
Horizon Shipbuilding Inc 13980 Shell Belt Rd, Bayou La Batre AL 36509
In-Place Machining Co., Inc. 929 North Buffum Street. Milwaukee,
WI 53212-3793
Leevac Industries, LLC, P.O. Box 1190, Jennings, LA 70546
Malta Drydocks, The Docks, Malta
Marisco USA, Inc.,100 Davidson Ave., Sommerset. NJ 08873
Motor-Service AB, Box 2115, 144 04 Ronninge, SWEDEN
Newport News Shipbuilding. 4101 Washington Ave., Newport News.VA23607
Norshipco, 750 West Berkley Ave.. Norfolk. VA 23523
Washburn Doughty, P.O. Box 296, E. Boothbay. ME 04544
Willard Marine. inc., 1250 N. Grove St., Anaheim, CA 92806
United Defense. 1525 Wilson Blvd.,Ste700 Arlington.VA 22209-2444
VT Halter, PO Box 3029, Gulfport, MS 39505
SHIP REPAIR
GMD Shipyard 360 Front St. Staten Island. NY 10304
G.S. Hydro U S.,1395 Bluehills Ave., Bloomfield CT 06002
International Ship Repair. 1616 Penny St.,Tampa FL 33605
United Defense. 1525 Wilson Blvd. Arlington VA 22209-2444
SHIP SIMULATORS
Kongsberg Maritime Ship Systems AS. PO Box 1009 3194 Horten Norway
SHIPYARDS
Alabama Shipyard. P.O.Box 3202, Mobile AL 36652
Allen Marine PO Box 1049 Sitka, AK 99835
Atlantic Marine, 8500 Hecksher Dr., Jacksonville, FL 32226
Damen Shipyards. PO Box 1. 4200AA Gorinchem/Holland
Derecktor Shipyard, 311 E. Boston Post Rd., Mamaroneck, NY 10543
Detyens Shipyards Inc.,1670 Drydock Ave.. Bldg 236 North Charleston.SC
29450
GMD Shipyard 360 Front St, Staten Island, NY 10304
Leevac Industries. LLC. P.O. Box 1190, Jennings, LA 70546
United Defense. 1525 Wilson Blvd.,Ste700 Arlington.VA 22209-2444
SHEAVES
Skookum, P.O. Box 280, Hubbard, OR 97032
SILENCERS
EM Products, 9700 W. 74th St., Eden Prarie. MN 55344
Houston Marine Training Services. 5728 Jefferson Hwy, New Orleans. LA 70123
Silex Inc 6659 Ordan Dr Mississauga. ON CANADA L5T 1K6
SIMULATION TRAINING
Marine Safety. Marine Air Terminal, Laguardia Airport. NY 11371
Maritime Institute of Technology 5700 Hammonds Ferry Rd,
Linthicum Heights. MD 21090
Seastate, 2 Egmont Road, Henderson, WA-6166, Australia
Transas Marine Overseas Ltd., St.Petersburg Branch, 12 Obukhovskoy, Oboroni, St.
Petersburg 193019 Russia
SKILLED LABORERS
Ameri-Force Inc.,3266 Talleyrand Ave.,Jacksonville, FL 32206
SLIDING DOORS
Walz & Krenzer. 91 Willenbrock Rd. Unit 4. Oxford, CT. 06478
SOFTWARE
Creative Systems. P.O. Box 1910. Pt. Townsend WA 98638
Fleet Technology 311 Legget Dr Kanata Ontario K2K 1Z8
Loadmaster International St Varvsgarten 11B SE 211 19 Malme. Sweden
Resurgence Software Inc.. Advanced Technology Center. 2021 Lakeshore Drive,
Suite 21D. New Orleans. LA 70122
Yachting Consult Nievwe Emmasingel 17 5611 AM Eindhousen
SPILL PREVENTION SYSTEM
MH Systems 10951 Sorrento Valley Rd #2F San Diego CA 92121
STABILIZATION SYSTEMS
Jered Industries 1608 Newcastle St Brunswick GA 31520
STEEL SERVICE CENTER
Ronson Technical, 2146 B Flintstone Dr., Tucker, GA 30085
STEERING GEARS/STEERING SYSTEMS
A. Van der Velden B.V. Rotterdam. P.O.B. 2061. 2930 AB Krimpen a/d Lek.
NETHERLANDS
Barkemeyer-Schifftechnik GmbH Birkenweg 11, D-21465 Reinbek
Cunningham Marine Hydraulics 201 Harrison St. Hoboken NJ 07030
Engine Monitor, Inc., 179 Hickory Ave.. Harahan, LA 70123
Hatlapa Uetersener Maschinenfabrik Tornescher WEG 5-7 D-25436
Uetersen. Germany
Jastram Engineering. 485 Mountain Hwy N.. North Vancouver.B.C. CANADA V7J
2L3
Kobell Manufacturing Co., Ltd.. 8238-129 street, Surrey. B.C. V3W0A6
Offshore Inland 3521 Brookdale Dr S. Mobile. AL 36618
STERN TUBE BEARINGS/ BUSHES
Duramax Marine. 16025 Johnson StP.O Box 67. Middlefield, OH 44062-0067
Konrad 1421 Hanley Rd Hudson, WI 45016-9376
Orkot Composites, 2535 Prairie Rd.. Unit D, Eugene. OR 97402
Thordon Bearings. Inc.. 3225 Mainway, Burlington, Ontario Canada L7M1A6
Vesco Plastics. P.O. Box 40647. Cleveland 2022. South Africa
STERN TUBE SEALS
Superbolt, P.O. Box 683, Carnegie. PA 15106
STRAINERS
Hellan Strainer 3249 East 80th St Cleveland. OH 44104
SURFACE PREP TOOLS
Advanced Environmental Systems. 2 Sutton Rd. Webster. MA 01570
Aurand Mfg., 1210 Ellis St.. Cincinnati. Ohio 45223
Flow International Corp., 23500 64th Ave. S.. Kent, WA 98032
Holdtight Solutions. Inc.,PO Box 770666 Houston. TX 77215-0666
NLB Corp.. 29830 Beck Rd. Wixom MI 48393
RMS of Georgia. 610 McFarland 400 Drive, Alpharetta. GA 30004
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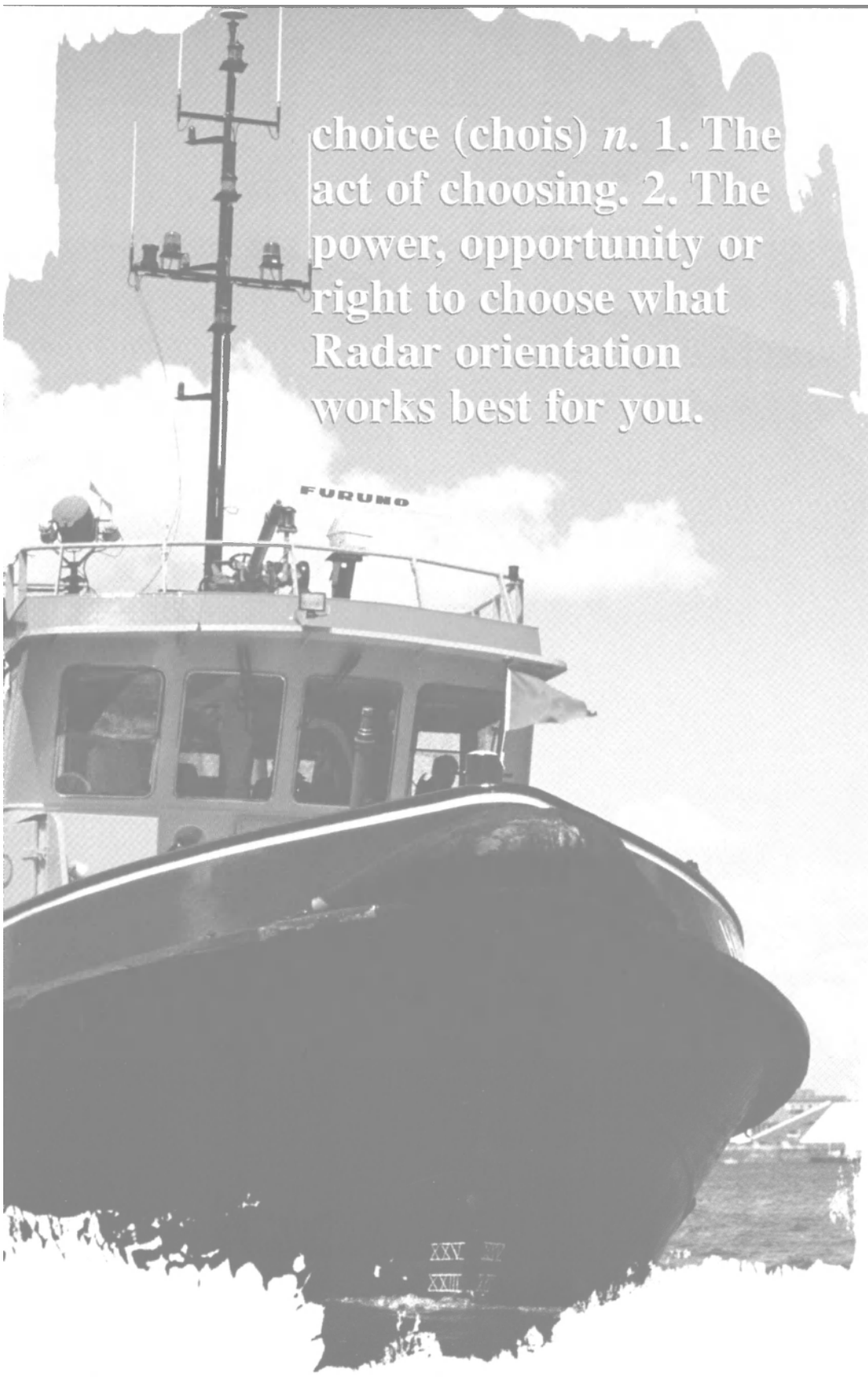

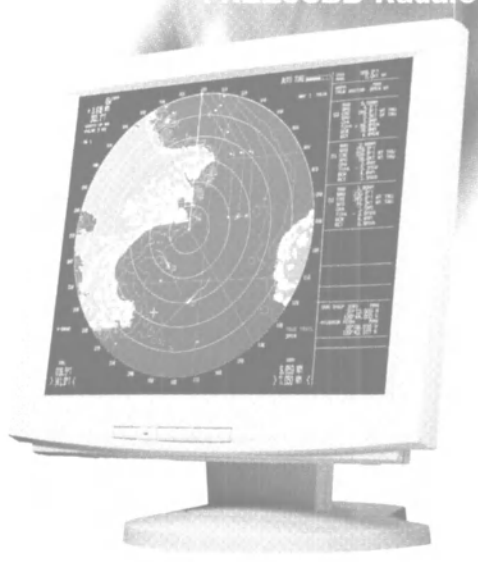

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