February 2003

MARITIME REPORTER
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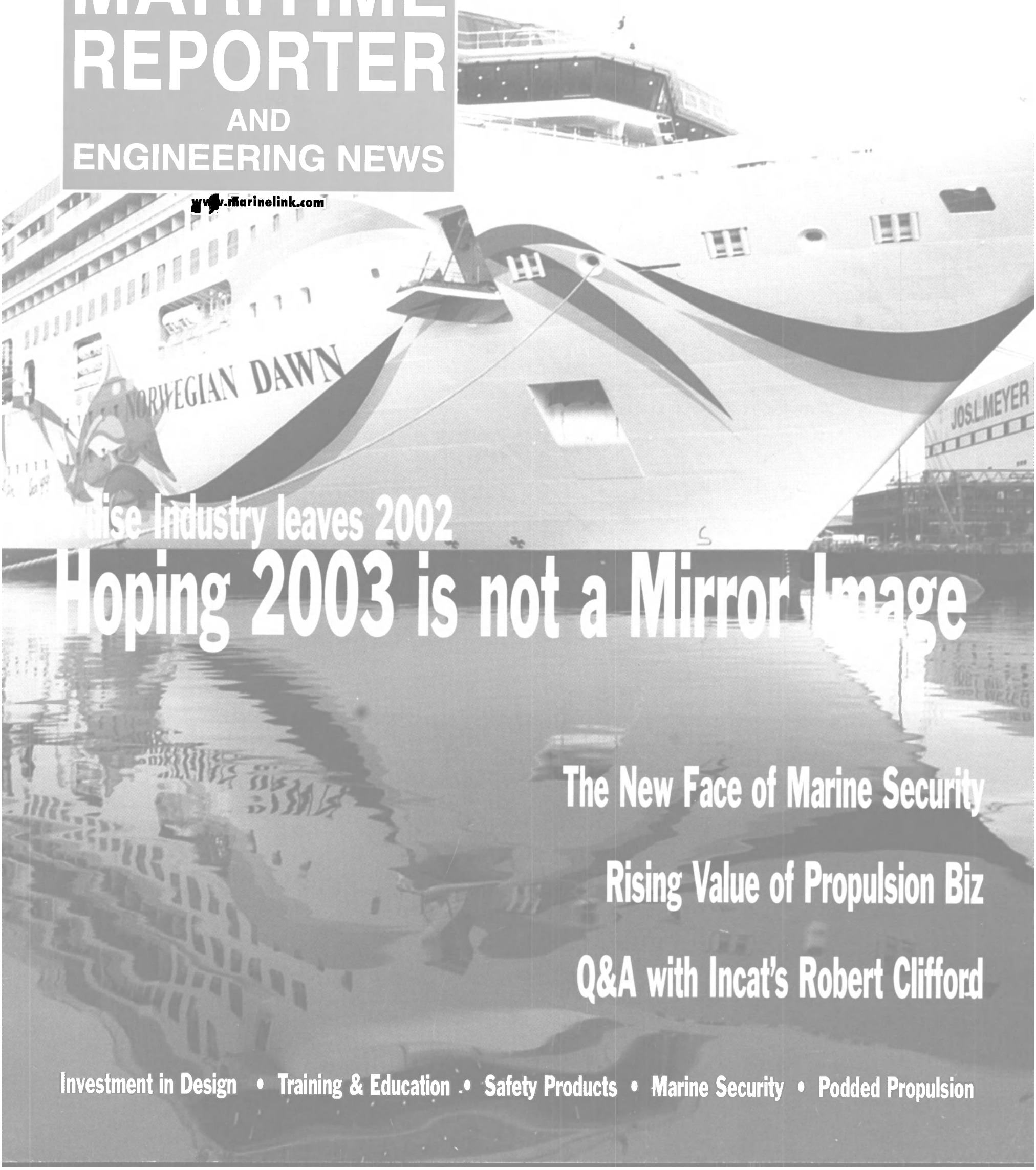

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The Index

Directory of companies given editorial coverage in this edition of *Maritime Reporter & Engineering News.*

The sinking of Prestige off the coast of Spain has elicited an outpour of response from around the world, exposing raw nerves on many fronts. From questions surrounding the age, condition and maintenance of the ship; to inquiries as to the responsibility of individual countries and the issue of ports of safe harbor; to the post-sinking arrest and detention of crew; Prestige represents a caldron of technical, ethical and political questions that will not soon be answered. Following are select responses to the December 2002 edition Editorial question "Why do ships break?"

Dear Editor

I have been in shipbuilding for over 35 years enjoying designing ship hull structures, starting in Scotland in 1966 and now residing in Houston, TX. Glibly, you could say that, 'Man makes the steel, man builds the ship and man makes the mistake of ignoring conditions of ship and weather and man 'makes ships break.' Look to the statement that interior storm handrails were not required on the Queen Mary (1938) because, 'she's too big to roll'. Then why there was a fleet of ambulances at dockside after (stormy) sea trials, to take away injured workers? And Titanic, etc. etc. I have advocated for a long time a system that ships would have to follow, identical to air traffic control. You file a 'flight' plan, it's studied, so you don't run into other ships that have a flight plan already on file, you're monitored during the passage and instructed to alter course for weather or other problems from ship traffic control. The technology exists. The cost of lives, environment, the ship and insurance is just too high today to have FULL control given over to a vessels crew, no matter how competent. That's why 747 pilots (captains) do what they're told.

In most cases ships are built strong enough, but we have to watch them more closely as they get older, just like man. If you would like further input, please call or write, thanks.

Signed, **John Milligan**
Houston, Texas

Dear Editor

When you think about it, when you go through your list of reasons in your article, it's amazing more ships don't break. While in general I agree with your column, and I agree that we should do everything practical to minimize the risk of structural failure, I disagree with your statement that "loss due to structural failure is simply unacceptable." We cannot build an unsinkable ship, although we can and should learn and improve. A more important question that the Prestige disaster brings up is, what about those "Port of Safe Harbor rules, or lack thereof"? Thank God there was no loss of life! Spain made a huge mistake by refusing to allow the Prestige refuge, and I think they are realizing that. I'm sure France will be reminding them of their mistake as oil is now washing up on French shores. But I'm not sure if the same circumstances occured again today, that Spain, France, Portugal, the U.S., or any other country would act differently. However, we have a rare opportunity while this disaster is in everyone's mind to change the politics and laws of Ports of Safe Harbor. There should be a treaty (and a U.S. law) that allows trained and experienced (and possibly licensed) salvors to do whatever is necessary, in their professional judgement, to limit or localize environmental damage, to save the vessel and cargo, and to save the lives of the crew. One politician or committee should not be able to unilaterally put the rest of us at peril for a disaster like the Prestige.

Signed, **Dave Touga**

Editor's Note

There are certain irrefutable trends driving the marine market today, the prime one being the continual enlargement of ships and the systems that drive them. As ships grow in size — so too does the level of security measures — and it is imperative that surrounding systems and products evolve in step to ensure the efficient and cost effective passage of cargo and passengers alike.

An example of this growth is seen in the marine power segment. Despite a generally softening of the new vessel orderbook projected over the next five years, the value of propulsion systems installed is predicted to rise through the year 2007, reaching nearly $5 billion in 2007, as David Tinsley reports in his Investment in Design column, starting on page 19. The marine power segment is worthy of monitoring in the coming years, as increasingly an investment in power — whether it be for a tugboat, tanker or cruise ship — will determine the difference between profit and loss. A slew of new rules and regulations, from the international and national sides, will come into play through 2007, increasing the pressure on engine builders to not only meet new environmental standards, but to meet them in the most efficient manner.

In early February 2003 the U.S. Environmental Protection Agency (EPA) will announce that it has adopted new emission standards for new marine diesel engines that will be installed on vessels flagged or registered in the United States. In essence, the new Tier 1 standards are equivalent to the internationally negotiated emission limits for oxides of nitrogen (NOx), and will be mandatory for Category 1, 2 and 3 engines (power ranges from 700 to 100,000 hp) in 2004. EPA will undertake another rulemaking in a few years to consider a second tier of more stringent standards, and interestingly, will consider whether it has the discretion under the Clean Air Act to apply any second tier of standards to engines on foreign vessels that enter U.S. ports. This should make for a spirited debate, particularly if the EPA's standards are more stringent then or differ significantly from IMO mandates, as the majority of ships that traverse U.S. ports are registered outside of the U.S., accountable to IMO standards.

It seems the push for lower emissions will make for many notable developments, as it was also announced last month that marine diesel titans Wartsila Corporation and MAN B&W Diesel have been encouraged to participate as principal forces in a large scale R&D integrated project under the auspices of the European Union (EU) to address the global problem of CO2 and pollutant emissions. The project — whose setup ensures that the commercial competition between the two groups of companies, including their respective licensees, remains unaffected — is expected to start in 2004.

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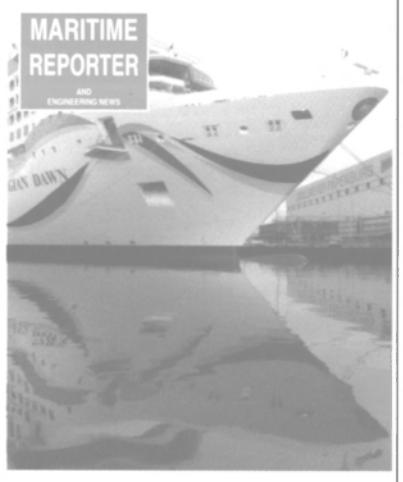
On the Cover



This month's cover features Norwegian Cruise Line's Norwegian Dawn, a spectacular new 92,50-ton ship from Germany's Meyer Werft Shipyard. Story on page 48.

In this edition

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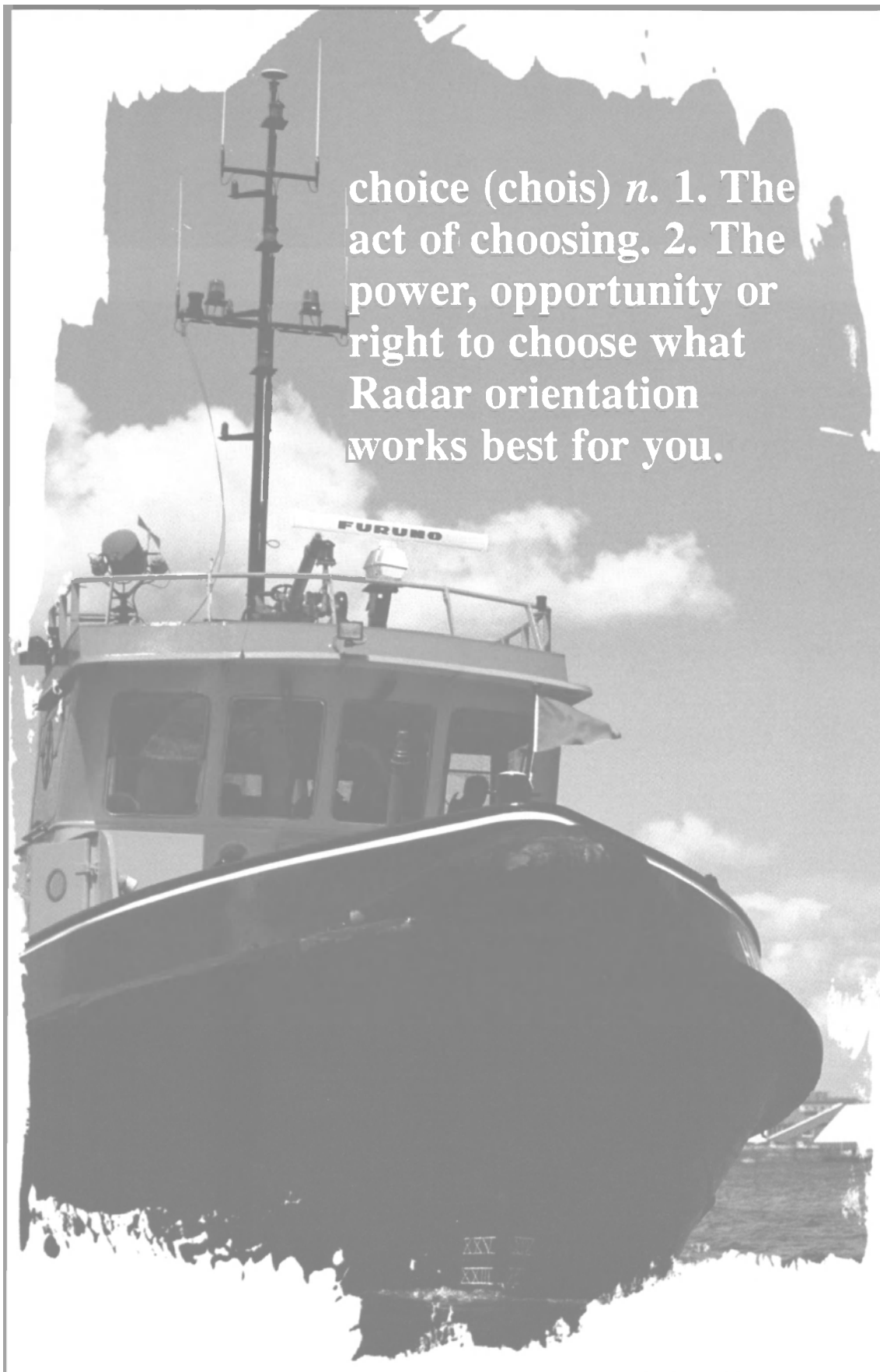

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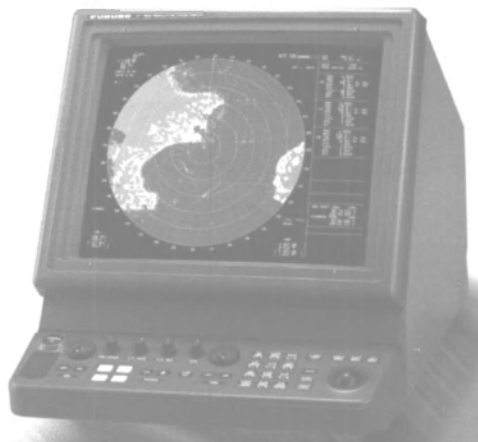

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The USCG, MTSA '02 and IMO - The New Faces of Security

By Charley Havnen

The U.S. maritime world is rapidly changing direction as security becomes an ever larger and more important issue to the federal government. We have seen the Department of Homeland Security created, the Maritime Transportation Security Act of 2002 become law, and the International Maritime Organization (IMO) establish new standards.

The new international requirements will go into effect in July 2004, and will apply to US vessels in international trade, foreign vessels that call on US ports and US facilities that engage in international trade. In many respects they mirror MSTA '02. The USCG has made it very clear that these international security requirements will be applied to domestic trade vessels that meet the criteria and to domestic trade facilities that are at risk of being involved in a transportation security incident.

This includes all facilities that handle oil and regulated chemicals, and may include other bulk cargoes that are classed by the government as being hazardous materials.

The security measures applicable in the U.S. will then be a complex mix of those generated by the IMO standards, MTSA '02, and USCG regulations (authorized by the MTSA '02).

Internationally, the meeting of the Assembly at IMO this past December adopted a potpourri of measures affecting security, including a new section of the current SOLAS convention, International Ship and Port Facility Code (ISPS), Chapter XI-2.

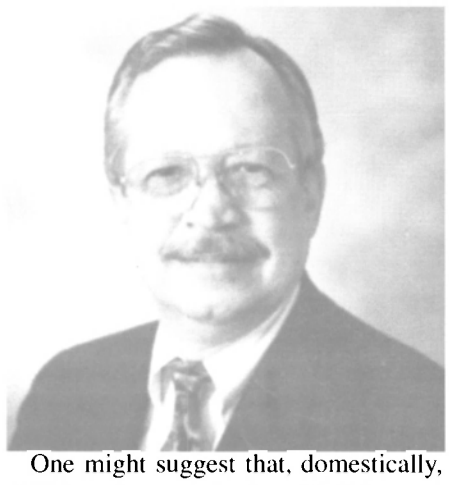
Threading throughout this and other IMO documents is a new system of Maritime Security (MARSEC) Levels, divided into three states, similar to those in use by the newly created Homeland Security Advisory System (HSAS) levels:

- MARSEC I: Our new maritime security normalcy. A security level that must be maintained for an indefinite period of time. Equivalent to HSAS Green (low), Blue (guarded), and Yellow (elevated).
- MARSEC II: Heightened threat of an unlawful attack is likely to occur within a specific area or against a specific class of target. Equivalent to HSAS Orange (high).
- MARSEC III: An attack against a specific target is expected. Equivalent to HSAS Red (incident imminent).

Actions under the new codes are then based upon the Security Level designated by competent authority.

- Automated Identification System (AIS): The AIS is an electronic identification device that will be carried by vessels in international trade. AIS will also fulfill the requirements of the USCG Vessel Traffic System (VTS). The mandatory carriage requirements will apply to all vessels in U.S. waters, not just those that enter VTS areas. Security concerns have sped up the AIS implementation requirements, and international and domestic operators must have the equipment installed by July of 2004. Domestic AIS will be required on at least the following:
- Towing vessels
- Certain passenger vessels
- Self-propelled commercial vessels over 65 ft. in length
- Other vessels as determined by the USCG

The individual vessels' AIS will communicate with each VTS, ostensibly minimizing oral communication between the vessel and the VTS operators. Once working, this would significantly streamline VTS operations and standardize vessel tracking. This would arguably improve safety by means of a simplified traffic control system. The trial system is at work on the Mississippi River around New Orleans, but needs further development before it can be finalized and is ready to be mandatory equipment on all vessels.



One might suggest that, domestically, AIS is only needed where VTS is present, but the requirement is nationwide. Several scenarios can be envisioned wherein the government could ensure that all vessels would be required to have AIS devices and, in fact, have the AIS installed, regardless of the U.S. waters navigated.

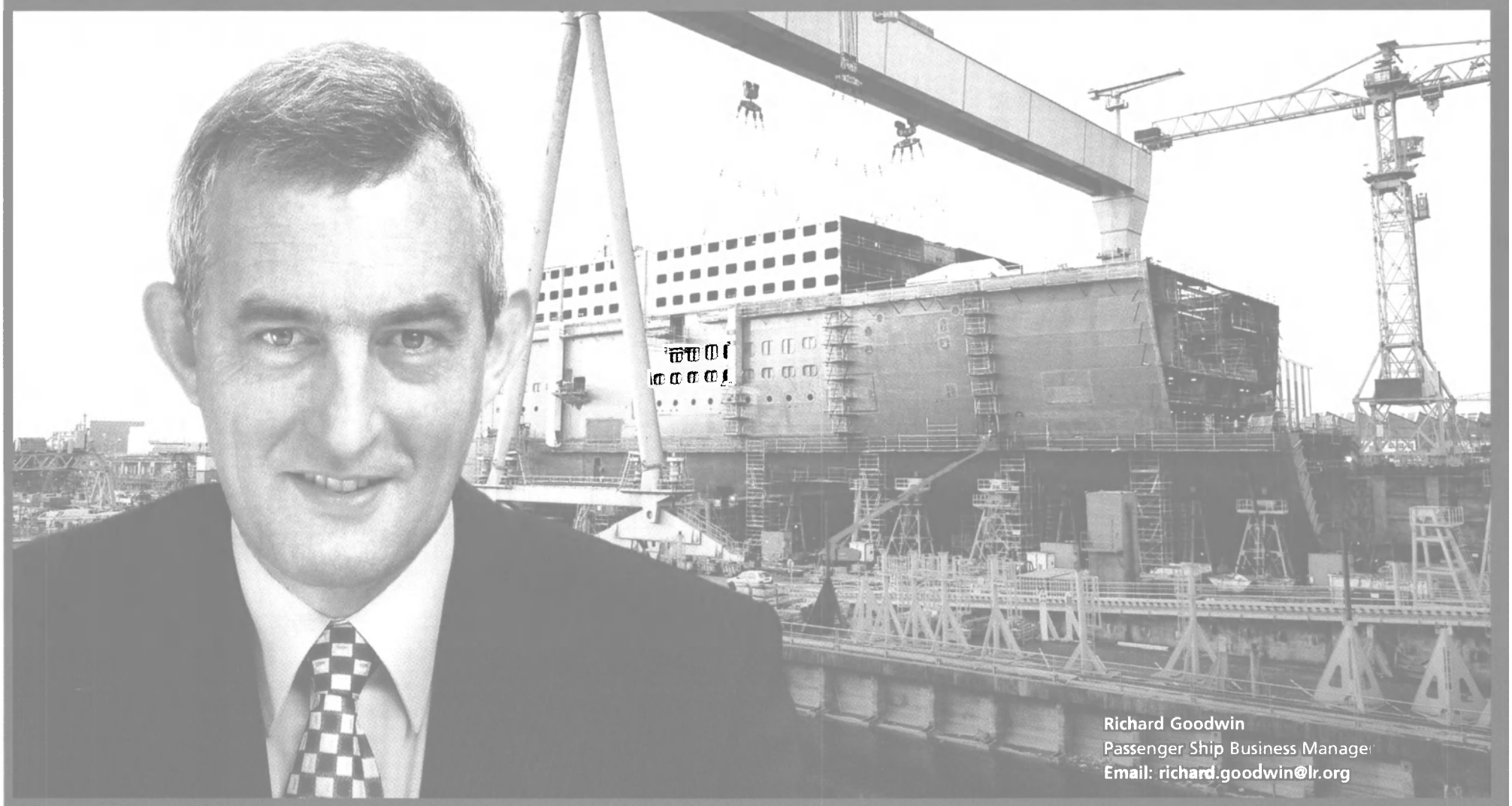
- Ship and Port Facility Security: New SOLAS Certificates will be required for both vessels on international voyages and port facilities that handle such vessels. A Declaration of Security (DOS) will be executed by security personnel on the vessel and port facility at each port visit and establish communications and security protocols. This is very similar to the Declaration of Inspection used by tank vessels and bulk liquid terminal personnel today. Shipboard and Facility Security Assessments will necessarily be performed to standards acceptable to the Flag State for the vessel and the Host Government for the facility, in this case the USCG. Security Plans will be required for vessels and facilities approved as with the Security Assessments.
- The IMO has recommended that floating platforms be included in the national security enhancements, but has not yet developed any standards for them. The USCG is considering including fixed & floating platforms, but has not made a final decision.

If maritime security is a real issue about which the government is serious, there is no question whatsoever that fixed & floating platforms should be included. It is inconceivable that the USCG is not making a major effort to protect these critical energy assets, which are otherwise exposed to attack from the open sea.

It is curious to note that Mobile Offshore Drilling Units (MODUs) when connected to the seafloor and offshore production platforms will be treated as

(Continued on page 53)

FrameWork



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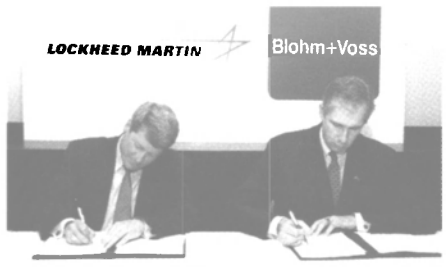
Littoral Combat Ship Takes One Step Closer to Reality

The push for a new class of U.S. Navy ships, vessels able to operate in shallow draft, near to shore environments, has taken a step closer to reality. The Navy is currently reviewing plans from half a dozen teams, and is expected next month to award additional dollars to three teams for further refinement. Current plans call for a fleet of between 50 and 70 vessels — smaller, faster and considerably cheaper than ships built for today's Navy — ready for production in the next few years.

The concept for Littoral Combat Ships, or LCS, is hardly new, and was a topic of hot debate at the AFCEA West 2003 exhibition and conference. With a distinguished and varied panel of



Admirals and Generals, and a packed crowd including a cross section from the World War II generation to Generation X, the topic "What Do We Want Our Ships To Do?" was debated, oftentimes in a heated fashion.

Moderated by Anteon's Dr. **Scott C. Truver** and discussed by many, including VADM **Alexander Krekich**, USN (Ret), President and CEO of Norfolk Shipyard and Drydock Corp., and RADM **George R. Worthington**, USN (Ret), former Commander, Naval Special Warfare Command, the discussion started and ended with LCS ... the Littoral Combat Ship. Just last month Lockheed Martin and Blohm + Voss announced an agreement (signing pictured above) to work together in providing the U.S. Navy with a Littoral Combat Ship (LCS) solution capable of meeting the stated requirements of speed, range, payload, cost, capability, survivability and supportability. The agreement, in the form of a memorandum of understanding, calls for a continuance of the relationship established between both companies for the Navy's ongoing Ship Concept Studies. LCS, a transformational new ship class for the Navy, will be expected to engage numerous threats in the littoral environment, the most significant of which include diesel submarines, small boats engaging in swarm warfare, and mines. A key element to the overall ship design will be the development and integration of different modules, easily interchanged with LCS, to address the various threats in the littorals. **Dale Bennett**, Lockheed Martin NE&SS-Marine Systems vice president and general manager, said "Blohm + Voss understood the need for modularity in ship design and integration as early as the 1970s, by developing flexible mission modules that provide for ease of spiral upgrades to systems over time. This approach to modular ship design resulted in the extremely popular MEKO-class ships, found in 11 navies worldwide today." Dr. **Reinhard Mehl**, Blohm + Voss executive board member, concurred: "We have learned many lessons along the way in refining the MEKO design that we expect to be of great significance for our LCS efforts."

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Secure Marine Transportation ... *Priceless?*

By Dennis L. Bryant,
senior maritime counsel,
Haight Gardner Holland & Knight

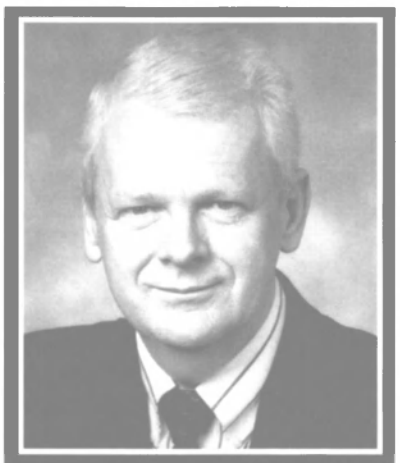
In the Maritime Transportation Security Act (MTSA), signed into law on November 25, 2002, Congress directed the U.S. Coast Guard to, among other things, establish a vessel security plan requirement for appropriate vessels operating in United States waters. Congress broadly defined the vessels that should have security plans as those that the Secretary (of the Department in which the Coast Guard is operating) believes may be involved in a transportation security incident. A 'transportation security incident' is defined as a security incident resulting in a significant loss of life, environmental damage, transportation system disruption, or economic disruption in a particular area. Because of the short deadlines imposed by the legislation, the Coast Guard will promulgate vessel security plan regulations following a series of public meetings, eschewing the usual process of proposing a rule and inviting comment thereon.

In its recent notice of public meetings, the Coast Guard included commentary on certain aspects of the process, giving the regulated community some clues as to what the regulations may eventually entail.

Regulated Community

It appears that the Coast Guard will impose the vessel security plan requirement on almost all commercial vessels operating in U.S. waters, including the following categories:

- All foreign ships required to comply with the International Convention on the



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.

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Safety of Life at Sea (SOLAS Convention);

- All foreign ships of countries not signatory to the SOLAS Convention.
- All U.S. vessels subject to 46 CFR, subchapters I (cargo and miscellaneous vessels), L (offshore supply vessels), H & K (passenger vessels), T (small passenger vessels, but only when engaged on an international voyage), D (tank vessels), O (vessels carrying bulk dangerous cargo); and I-A (mobile offshore drilling units).
- All U.S. towing vessels greater than 20 ft. (6 m) in registered length.

This listing includes virtually every non-U.S. commercial vessel coming to the United States and every U.S. self-propelled commercial vessel with the exception of a few such as commercial fishing industry vessels, small passenger vessels not engaged on international voyages, nautical school vessels, and small towing vessels (of 6 m or less in registered length). Also exempted are most barges, other than tank barges.

U.S. Standards

Ideally, the U.S. Coast Guard would deem compliance with the international standard for a ship security plan to be full compliance with any U.S. standard for a vessel security plan, but certain realities intrude. First, the international ship security plans only have to be submitted to — and approved by — the flag administration. The MTSA mandates that vessel security plans be submitted to — and approved by — the U.S. Coast Guard. International ship security plans are to be written in the working language of the crew (and in English, French, or Spanish, if the working language is none of these specified languages). As a practical matter, the U.S. Coast Guard will only accept for review plans written in English.

The Vessel Security Plan must be consistent with the National Maritime Transportation Security Plan, which will

International Standards

The U.S. Coast Guard will incorporate, in full, the vessel security plan provisions recently promulgated at the International Maritime Organization (IMO) meeting in London. There, delegates adopted the International Ship and Port Facility Security (ISPS) Code as a new chapter of the SOLAS Convention. The ISPS Code requires each company owning or operating ships subject to the SOLAS Convention to designate a company security officer and to designate a ship security officer for each ship. Following a security assessment, a ship security plan is being written for each ship and submitted to the flag administration for approval. The ship security plan must address at least the following issues:

- Measures designed to prevent weapons, dangerous substances and devices intended for use against people, ships or ports and the carriage of which is not authorized from being taken on board the ship;
- ID of the restricted areas and measures for the prevention of unauthorized access to them;
- Measures for the prevention of unauthorized access to the ship;
- Procedures for responding to security threats or breaches of security, including provisions for maintaining critical operations of the ship or ship/port interface;
- Procedures for responding to any security instructions Contracting Governments may give at security level three;
- Procedures for evacuation in case of security threats or breaches of security;
- Duties of shipboard personnel assigned security responsibilities and of other shipboard personnel on security aspects;
- Procedures for auditing the security activities;
- Procedures for training, drills and exercises associated with the plan;
- Procedures for interfacing with port facility security activities;
- Procedures for the periodic review of the plan and for updating;
- Procedures for reporting security incidents;
- Identification of the ship security officer;
- Identification of the company security officer including with 24-hour contact details;
- Procedures to ensure the inspection, testing, calibration, and maintenance of any security equipment provided on board, if any;
- Frequency for testing or calibration any security equipment provided on board, if any;
- Identification of the locations where the ship security alert system activation points are provided;
- Procedures, instructions and guidance on the use of the ship security alert system, including the testing, activation, deactivation and resetting, and to limit false alerts.

be prepared by the Secretary for deterring and responding to a transportation security incident. Further, it must be consistent with the Area Maritime Transportation Security Plan for each area within which it operates. The Areas, for this purpose, are expected to align with the Captain of the Port (COTP) zones. The Coast Guard has disseminated neither the National nor the Area Maritime Transportation Security Plan, although it has issued a Navigation and Vessel Inspection Circular (NVIC) providing guidance to field units related to preparation of port security plans. It is unclear how owners and operators will be expected to comply with the consistency requirement if the various national and area plans are not promulgated soon.

Qualified Individual

The plan must identify the qualified individual (QI) having full authority to implement security actions, and require immediate communications between that individual and the appropriate Federal official (presumably the COTP) and the persons providing additional security. It is unclear what qualifications will be expected of a QI. If it is similar to the standards utilized under the Oil Pollution Act of 1990 (OPA 90) for oil spill vessel response plans (VRPs), the individual will have to be based in the United States and be available 24-hours a day.

Availability of Security Measures

The plan must also 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, or a substantial threat of such a security incident. As with the QI, this clearly derives from OPA 90, but it is uncertain what security measures the Coast Guard envisions. It could be anything from a guard service posted at points of ingress and egress from the ship to divers searching the hull for limpet mines.

Security Incident Response Plan

Either as part of the vessel security plan or as a stand-alone document, the Secretary must require each vessel to prepare and submit a security incident response plan. The plan is to provide a comprehensive response to an emergency, including notifying and coordinating with local, State, and Federal authorities, including the Director of the Federal Emergency Management Agency (FEMA), securing the vessel, and evacuating vessel personnel. The limited legislative history of this provision indicates that Congress was concerned about response to such things as an oil spill from the vessel that might arise from a terrorist attack or other security incident. The Notice issued by the Coast Guard provides no indication of how the agency will interpret and implement this provision.

Deadlines and Implementation

The MTSA provides that the vessel security plan must be submitted to the Coast Guard within six months after promulgation of the interim regulations. The vessel for which a vessel security plan is required may not operate in U.S. waters one year after promulgation of the interim regulations unless it has an approved plan and is operating in compliance therewith. Notwithstanding the 1-year restriction, the Secretary may authorize a vessel to operate without an approved security plan (for up to 1 year after submission of a security plan), if the owner or operator has certified that it has ensured by contract or other approved means the availability of secu-

rity measures necessary to deter to the maximum extent practicable a transportation security incident, or a substantial threat of such a security incident. Rulemakings under the MTSA are exempted from the usual provisions of the Administrative Procedures Act, including the requirement for notice and public comment. The interim regulations are to be issued as soon as practicable, except that regulations establishing the security incident response plan are to be promulgated before April 1, 2003. Interim regulations are to be superseded by final regulations (presumably developed in accordance with the Administrative Procedures Act) no later than November 25, 2003.

Cost of Compliance

The Coast Guard estimates that it will cost the average SOLAS freight ship $25,900 in the first year to comply with the vessel security requirements, with subsequent years costing $11,949 each. The average SOLAS tanker would incur costs of $17,700 the first year and $11,539 annually in subsequent years. For the average SOLAS towboat, the costs would be $4,900 and $199 the first and subsequent years respectively. For a SOLAS cruise vessel, the added costs are estimated at $11,800 the first year and $13,204 in subsequent years.

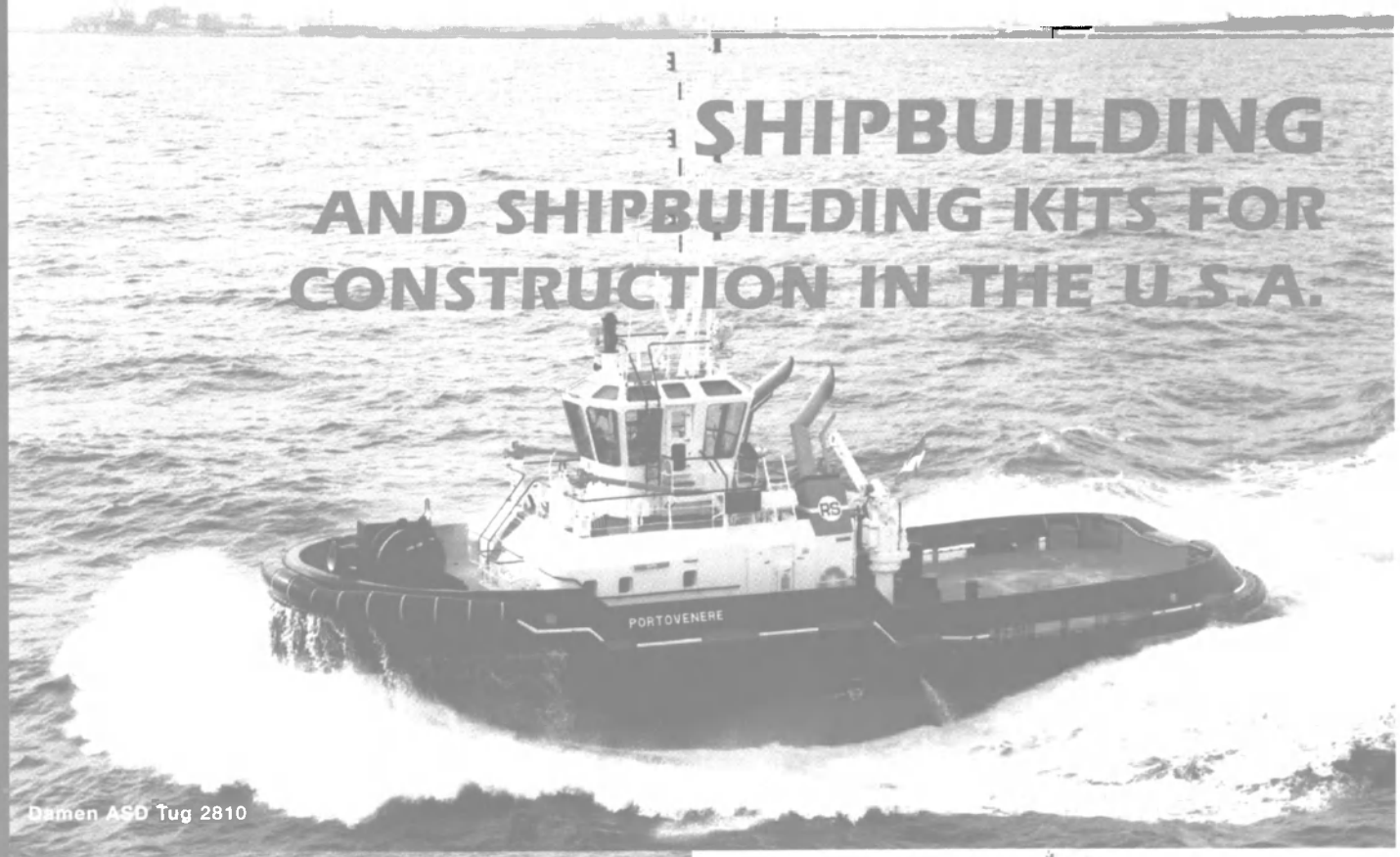
The Coast Guard has estimated the cost for compliance by the U.S. fleet to be approximately $188 million in the first year and $144 million for each subsequent year. The ten-year cost of the vessel security program is estimated to cost the U.S. fleet $1.1 billion (present value). For some reason, known only to the agency, the Coast Guard did not publish an estimate for the cost of compliance by foreign vessels (either individually or in the aggregate). We should assume that, for the most part, the cost of compliance by a U.S. vessel operating under SOLAS is similar to that which would be experienced by a foreign vessel operating under SOLAS. The Coast Guard estimates (in other contexts) that 75 percent of the cargo vessels calling in U.S. ports are registered in nations other than the United States. Thus, fairly simple mathematics reveal that the total first year cost of compliance with the U.S. vessel security plan requirement will be approximately $752 million, with annual costs of $576 million in subsequent years. The total ten-year cost of the program would then be approximately $4.4 billion (present value). For comparison purposes, it should be remembered that the Coast Guard estimated the cost of compliance with its double hull rule to be $3.5 billion (present value) in 1991.

Summary

The U.S. Coast Guard has a daunting task ahead as it works to develop vessel security plan requirements in the context mandated by the MTSA. It will need assistance from the regulated community if it is to establish standards that are both consistent with the statute and workable. Due to severe time constraints, industry must make its views known now.

The goal is to deter, to the maximum extent practicable, a transportation security incident - in other words, to harden the target. Success consists in instituting the appropriate mix of security measures to deter the terrorists without either bringing commerce to a halt or bankrupting the players. This is a delicate balance indeed.

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



Damen ASD Tug 2810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Damen Stan Tug 2608

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Damen Stan Tug 2207

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Circle 217 on Reader Service Card

Three PacifiCat-class Fast Ferries to be Sold

Three 400-ft. (122-m) PacifiCat-class fast ferries capable of carrying 1,000 passengers and 250 vehicles at speeds of up to 34 knots will be sold at an international, unreserved public auction at 11:00 a.m. PST on March 24, 2003 at Canada Place, Vancouver, by Ritchie Bros. Auctioneers. The aluminum vessels, PacifiCat Explorer, PacifiCat Discovery and PacifiCat Voyager, are among the largest catamaran fast ferries in the world, designed by Phil Hercus of Incat Designs, Sydney, Australia, and built in British Columbia, Canada. The PacifiCat fast ferries can be remotely monitored in real time for position, speed, trim, jet angles and rpm; a 287 kW bowthruster improves maneuverability at low speeds; and an integrated bridge system allows enhanced safety monitoring, control and crew deployment. Each vessel is fitted with a 75 sq. m. galley. The three PacifiCats will be sold by live auction at 11:00 a.m. Pacific Standard Time at the Canada Place cruise ship terminal, Vancouver, B.C. Bidders will also be able to participate in the auction over the Internet using the rbauctionBid-Live service from their own office or from one of Ritchie Bros.' auction facilities in Toronto, Canada; Orlando, U.S.; Baltimore, U.S.; Moerdijk (Rotterdam), the Netherlands; Dubai, the United Arab Emirates; Singapore; Brisbane, Australia; and Toluca (Mexico City), Mexico. Interested bidders must first register with Ritchie Bros. and will be required to file a $2-million deposit to bid on the vessels.

4-Sale: The PacifiCat Explorer, PacifiCat Discovery and PacifiCat Voyager.

Full details about the auction are available on the Ritchie Bros. web site.

NOL's Jacobs Ousted

Neptune Orient Lines Limited said **Flemming R. Jacobs** ceased to be the Group President and CEO as of January 6, 2003. No successor was immediately named, with the Executive Committee of the Board comprising **Cheng Wai Keung** (Chairman); Dr. **Friedbert Malt** (Vice-Chairman); **Boon Swan Foo** (Director); and **Lim How Teck** (Executive Director and CFO) will oversee the management of the Group.

Dr. **Friedbert Malt** has been appointed Vice-Chairman of the Board of Directors of the Company.

Ron Widdows will be appointed as acting CEO of APL Liner business. He is currently the Executive Vice President and has been with APL Liner for 22 years. He has 30 years' experience in the liner industry.

Cheng Wai Keung, Chairman of the Company said: "The NOL Board and management are determined to focus the Group towards sustained profitability in the future. The Board felt that it is time for a new leadership."

The Rising Value of Propulsion Business

by David Tinsley, technical editor

Despite a fall in the overall number of vessels forecast to be delivered from shipyards until 2007, the value of the propulsion systems installed in newbuilds is expected to show a rise from 2004, reaching nearly $5-billion by 2007 on the strength of increasing power requirements.

A new business study entitled The World Marine Propulsion Report 2003-2007* predicts that newbuild deliveries measured by tonnage will grow by four-percent over the five years, against a fall in vessel numbers of 10-percent.

However, the propulsive power embodied in the newbuild influx should increase by eight-percent compared with the 1997-2002 period.

The market for main engines, typically accounting for around 60-percent of overall propulsion system values, is likely to be worth around $2.7-2.8 billion annually throughout the period from 2003 to 2007.

After falling back from an estimated 2002 peak of 15,100-MW to 14,479-MW in 2004, it is anticipated that new main engine installations will increase in aggregate power over the next few years, attaining more than 15,500-MW in 2007. The rise in unit power needs will be greatest for containerships and passenger and cruise vessels, in keeping with growth in ship size and no lessening in speed criteria.

The study is the work of business analysts Douglas-Westwood and marine industry data providers. Using information from the databases of worldwide vessels of 100-gt and above, The World Marine Propulsion Report gives a detailed analysis of the sector and shows the trends impacting on engine deliveries over the past five years as well as projections for the period to 2007.

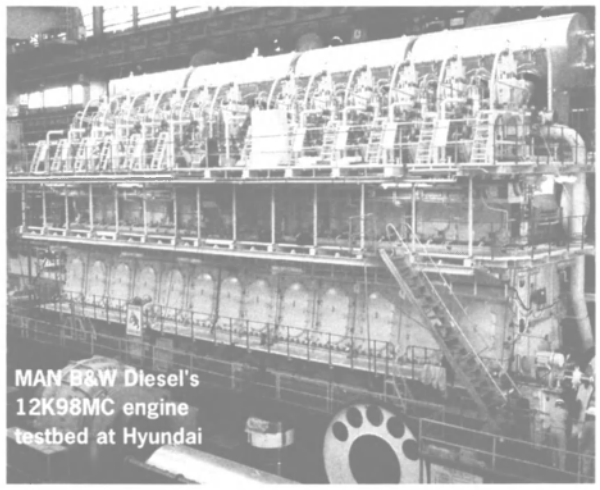
A specially developed model has been used to forecast the market during the next five years. This takes into account major influencing factors such as oil prices, increasing vessels sizes and power needs, and changes and developments in global trade patterns.

The results are output as a series of tables and charts forecasting sales from 2003 to 2007 by differing types of propulsion systems, both in units and U.S. dollar values, segmented by region and vessel category.

For the five-year forecast period from 2003 to 2007, it is anticipated that global shipbuilding activity will be driven by growth in seaborne trade in the order of two to three-percent per annum.

However, as average ship size increases, the number of newbuild deliveries will be fewer, and the report's compilers expect numbers to reach a low point in 2004. Civil marine gross tonnage production, though, is forecast to rise by four-percent, with a minimum completion level of 30-million gt in any year.

The annual output value of ships delivered is expected to vary between $36-billion and $38-billion. The value of the propulsion systems is calculated at between $4.8-$5 billion per annum throughout the period, with the main engine or prime mover element reaching $2.9-billion by 2007.



MAN B&W Diesel's 12K98MC engine testbed at Hyundai

The report anticipates that the two leading main engine designers, MAN B&W and Wartsila, will maintain their share of the market over the five-year period, accounting for around 75-percent of the total propulsive power requirement of all newbuilds, and about 70-percent of the value. In terms of the number of main engines, the three market leaders, namely MAN B&W, Wartsila and Caterpillar, are expected to account for 55-percent of the annual influx.

Japanese producers and licensees are expected to deliver the greatest value of main engines, although South Korea and China should show the highest rate of growth. Attributed values of overall propulsion system installations in newbuilds for 2003 - 2007 are in the order of $1.21-1.25 billion for bulk carriers and cargo vessels, $1.17-1.29 billion for tankers, and $1.05-1.20 billion for containerships.

Italian Versatility

A judicious policy of business expansion based on a broader product range has been taken an important stage further by Italian shipbuilder Rodriquez Cantieri Navali, through the acquisition of Intermarine, a specialist in craft constructed from composite materials.

With Intermarine now part of the growing Rodriquez network, earlier strengthened by the takeover of yacht builder Conam, the Italian group has given new expression to its intent in widening its scope in higher value-added sectors of the market.

Hydrofoils, fast monohull ferries, catamarans and patrol boats remain central to the group's business endeavors, and other building blocks in the current development program have increased its capabilities in the ferry market. However, the acquisition of Intermarine denotes a further commitment to product diversification, not least to the comparatively recent drive into the large yacht construction sector.

Intermarine's standing in the naval and agency vessel category, reinforced by a current newbuild series of customs patrol boats for Italy's Guardia di Finanza, also complements the Rodriquez portfolio.

December's domestic contract for a 40-knot monohull ferry of 164 ft. (50 m), following announcements during the year of two projects involving newbuilds of 275.5 ft. (84 m), has ensured continuity of production of fast monohull ferries embodying homegrown Aquastrada technology. A major order from Brazil for commuter ferries, involving a new Brazilian shipbuilding affiliate of Rodriquez, has also boosted the group's stake in the ferry market, while a 28-unit series of patrol boats has also enabled the group to play to its strengths.

However, the companion move into the luxury yacht business has been such that the Rodriquez workload now includes craft of 118 ft. (36 m), 125 ft. (38 m) and 239 ft. (73-m), the latter ranking as the largest yacht to be built in Italy for 20 years. The Rodriquez Yachts division, based at the group's shipyard in Pietra Ligure, in northeastern Italy, can handle craft in aluminum or steel up to 492 ft. (150 m) in length. With Intermarine's Sarzana facility near La Spezia, now part of the organization, the offering has been embellished with yachts up to 148 ft. (45 m) of composite construction.

At a time when outsourcing is the order of the day, Rodriquez holds faith by the principle of self-sufficiency in key areas, demonstrated by in-house affiliates Rodriquez Marine Systems, versed in a range of shipboard technical disciplines and equipment, and Rodriquez Engineering, the Genoa-based design, and research and development undertaking.

Propulsion Report Available

The World Marine Propulsion Report 2003-2007, is available from Douglas-Westwood Ltd, Canterbury, Kent, U.K. For more information:

Circle 99 on Reader Service Card

Derecktor to Build Second Ferry for Alaska

Derecktor Shipyards was awarded a contract to build another high-speed ferry for the Alaska Marine Highway System (AMHS). This ferry, to be named the M/V Chenega, is the second of a two-vessel contract worth a total of $67.9M. In February of 2002 Derecktor Shipyards was awarded the contract to design and build two high-speed passenger & automobile ferries as the first phase of Alaska's plans to re-tool its regional water transportation system. M/V Chenega will sail in the Prince William Sound area of south-central Alaska, connecting the ports of Cordova, Valdez, and Whittier. The first vessel, the M/V Fairweather, will connect the port of Sitka and Juneau in southeast Alaska. Designed by the naval architecture firm of Nigel Gee & Associates, of Southampton, England, each of the vessels is 235 ft. (72 m) long, carries 250 passengers and 35 cars (or a combination of cars, trucks, and RVs), and travels at speeds up to 36 knots (41 miles per hour) The vessels employ a catamaran (twin-hull) design of lightweight aluminum construction. They are powered by four MTU medium-speed diesel engines, each driving a Kamewa waterjet propulsor.

Circle 29 on Reader Service Card

Graykowski Joins Kvaerner Philadelphia

John Graykowski has joined Kvaerner Philadelphia Shipyard, Inc., as Senior Vice President & General Counsel, starting February 1, 2003. Graykowski will be responsible for all aspects of Marketing, External Relations and Legal Affairs. Since 2000, John was a Partner with Blank Rome LLP (formerly Dyer Ellis & Joseph). Prior to joining the firm, Graykowski was Acting Administrator and Deputy Administrator of the Maritime Administration, U.S. Department of Transportation from 1994 to 2000.

ABP Southampton Gets New Marine Services

Associated British Ports' (ABP) Port of Southampton and VT Halmatic signed a marine services contract whereby VT Halmatic will provide a Fleet Contract Hire Scheme to ABP Southampton, one of the UK's largest and busiest ports. ABP Southampton's existing pilot, survey and patrol fleet comprising seven vessels will be procured by VT Halmatic and leased back on a fully supported contract for 10 years, incorporating a six-vessel replacement program. The first replacement vessels will be delivered to ABP's Gosport Pilotage Station before the end of 2003 with further vessels coming on line over the duration of the contract.

The new pilot cutters will be the Halmatic Nelson 48/50 type, fitted with Volvo Penta engines rated at 450 horse power to provide a service speed of 23 knots. VT Halmatic will be providing 24 hour/365 day per year maintenance and service cover.

Wartsila Tests First Dual-Fuel Engine

Wartsila Corporation reported that it has successfully completed the factory acceptance test of the first Wartsila 50DF engine in a series of four dual-fuel engines for a 74,000 cu. m. LNG carrier. The LNG carrier is under construction at Chantiers de l'Atlantique for the French gas holding company Gaz de France. Due for delivery in 2004, it will be powered by four Wartsila 6L50DF dual-fuel engined generating sets which will meet all the ship's propulsion and shipboard electrical requirements. The Wartsila 6L50DF engines each develop 5,700 kW at 514 rpm.This will be the first LNG (liquefied natural gas) carrier to be powered by electric propulsion, and one of few to have internal-combustion engines instead of the more usual steam turbine plant. The tests of the Wartsila 50DF engine began in Finland early November 2002. In August 2003, all four engines will be delivered to the shipyard for installation in the LNG carrier.

Circle 28 on Reader Service Card

Hellenic Navy Orders Siemens Technology

Siemens Industrial Solutions and Services (I&S) Group is now to equip a fourth Class 214 submarine with modern propulsion, control and monitoring technology for Greece. The project includes delivery of the Permasyn electric motor, the PEM fuel cell modules, and the "Nautos" automation system. Delivery of the submarine to the Hellenic Navy is scheduled for 2009. A PEM fuel cell system (PEM - Polymer Electrolyte Membrane) powers the submarines underwater, permitting propulsion without outside air (air independent propulsion, AIP). The AIP system is a development by HDW. Siemens is providing the fuel cell modules and the control and monitoring equipment.

Navigator of the Seas — A New Course for Profitability

By Greg Trauthwein

It is incredible to consider that from the icy environs of Turku, Finland, emerge great ships of steel that are designed to spend their lives transporting passengers to and from mostly tropical paradises.

Such was the feeling upon boarding the nearly 140,000-gt Navigator of the Seas — newbuilding 1347 — just three days before its Nov. 18, 2003 hand over to Royal Caribbean Cruises Ltd. Navigator is the fourth, latest and arguably greatest of the five-ship Voyager series. While the first ship of any series is, indeed, special, particularly so in the Voyager-class series as it was a world record setter based on its enormous size and onboard amenities, Navigator features a number of enhancements that have resulted from a unique cooperation, long-relationship and good communication among Royal Caribbean, Kvaerner Masa-Yards and the myriad designers, naval architects and marine engineers, and suppliers that conspire to bring these ships to life.

(photo: Greg Trauthwein)

"Extra Security now costs millions extra every year."
— Harri Kulovaara, senior vice president of fleet operations and newbuilding, Royal Caribbean Cruises Ltd.

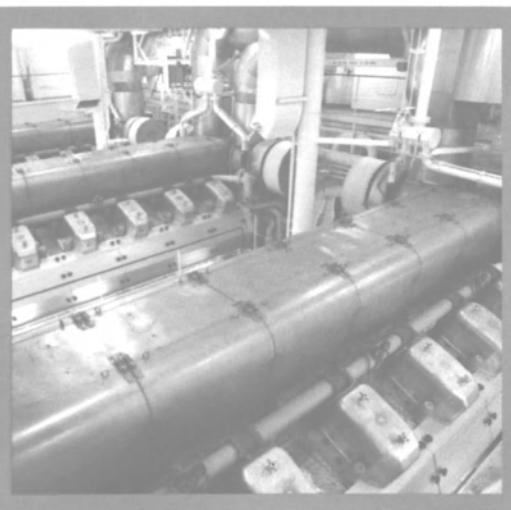
Strong by Design

Speaking a few days before the delivery of the massive Navigator of the Seas, **Harri Kulovaara**, senior vice president of fleet operations and newbuilding, Royal Caribbean, said despite the overall economic malaise, that Royal Caribbean had enjoyed a relatively stable year, with 106 percent occupancy and a slight two percent drop in yield. He said the carrier, the industry, is convinced a bounce back in business is coming, pending the "normalization of the world." Focusing on the ship, Kulovaara pointed out that the operational experience with the first three ships proved instrumental into fundamental and substantial changes for numbers four and five, changes intended to not only enhance the aesthetic beauty of the ships inside and out, but to enhance their cost efficiency. This is most interesting, as he noted "we never imagined from the beginning that this would be a long series ... at the beginning , we though we would build one or two." The first three ships in the series, Voyager of the Seas, Explorer of the Seas and Adventure of the Seas were delivered in October 1999, September 2000 and October 2001 respectively.

The most significant change was the use of bolt-on balconies, a move that not only enhances the subjective beauty of the ship, but comes with a substantial weight savings. Kulovaara said that concern with the initial ships centered on steel concerns because of the Royal Promenade running in the middle of the ship. The Royal Promenade is a four deck high horizontal promenade, a design featured for the first time on this Voyager-class cruise ship series. The length of the promenade is nearly 400 ft. (120 m), and it has in each end an 11 deck high atrium, the Centrums. The Royal Promenade also features inside staterooms with a view.

Kulovaara said once significant operational experience was had, it was determined that they could lighten it up by using less steel and incorporating the bolt on balconies.

Navigator of the Seas also incorporates a radically larger children's area - by his estimation the largest children's area at sea - as Kulovaara admitted the carrier was overwhelmed with the number of young cruisers coming onboard, sometimes accounting for 1,300 of the ship's 3,800 passengers. Kulovaara is quick to point out, though, that the ship and its numerous facilities are not large just for the sake of being large. The space has been apportioned judiciously, particularly so on Navigator, to maximize income opportunities. Another example of this is the replacement of a sports-themed bar in the Royal Promenade with an upscale Wine Bar.



LEFT: The view from Navigator's bridge. **CENTER:** Six Wartsila 12V46C diesel engines providing a cumulative 75,600 kW help drive the massive Navigator at 22 knots. **RIGHT:** Extra steel was incorporated on the first three Voyager class ships out of concern of the effects of the massive 400-ft. Royal Promenade on the ship. Operational experience showed that the Navigator and subsequent ships could be lightened up.

Technically Speaking: "It (too) is Big"

The Navigator of the Seas has three azimuthing electric 14 MW Azipod units. The two units on the sides are fully azimuthing whereas the one at the centereline is a fixed Azipod unit. Azipod incorporates an electric AC motor, located inside the propeller pod, which directly drives a fixed-pitch propeller. It has been developed jointly by Kvaerner Masa-Yards and ABB. "We could not operate a ship this large using only two propellers," said **Harri Kulovaara,** senior vice president of fleet operations and newbuilding, Royal Caribbean Cruises Ltd. "The pods are essential ... without them, the maneuverability would not be there."

With Azipod propulsion no shaft lines, internal electric propulsion motors, rudders and rudder machinery, nor transversal stern thrusters are needed. By this weight is saved and space is available for other advantageous use, such as added passenger capacity. In addition, the Azipod propulsion system improves the ship's fuel efficiency. The Navigator of the Seas has been designed to manage 40 knots side winds — where ships normally can stay maneuverable in 25-30 knots winds. To handle this, there are four 3 MW tunnel thrusters in the bow in addition to the Azipod units in the stern. Sea trials shown that the ship can even move sideways with a speed of 3 knots.

High Level of Redundancy

Navigator of the Seas has a very high level of plant redundancy, which has an impact on the safety of the ship. Navigator has a redundancy built into it in such a way that at least 50 percent of nominal capacities remains available after any single failure. Some features include:

- Divided machinery plant into two independent parts, including main machinery plant, fuel tanks, electric machinery, auxiliary systems, ventilation, piping, cabling and control and automation, basically from "fuel storage tanks to the propellers."
- Divided redundant main electric distribution and monitoring between the wheelhouse and control room (on Deck 1), and between the two separated high voltage switchboards (on Deck 0) and the three separate cyclo-converter rooms (on Deck 0 and Tween Deck).
- Divided redundant telephone, public addressing, control and alarm systems.

The ship has Det Norske Veritas' RP — Redundant Propulsion classification. It is the highest level of redundancy classification.

Waste handling

On deck 1 are also the garbage handling equipment. This is one of the first installations onboard a cruise ship designed completely without damping/discharging to sea. The system includes a 1600 kW incinerator, o food waste system, a recycling and storage system for glass, metal, ash and paper – including a new automatic ash transport and packing process.

This statue stands guard outside of the Navigator's "19th Hole" on a cold day in Finland just prior to the ship's delivery

A Collaborative Effort

With a gross tonnage of approx. 140,000, a passenger capacity of 3,800 and a crew capacity of 1,200 — totaling some 5,000 people onboard — the Voyager-class cruise ships are by far the biggest in the world. The total length of Navigator of the Seas is 1,020 ft. (311.1 m), the breadth is 126 ft. (38.6 m) at waterline level (161 ft./49.1 m breadth at the bridge wings) and the height is 237 ft. (72.3 m) from keel to the top of the funnel.

"Again we have built and handed over a great cruise ship to our client - to specification — on time and to budget," said **Jorma Eloranta,** President and CEO of Kvaerner Masa-Yards. The concept design of the Voyager-class cruise ships was made by Kvaerner Masa-Yards Technology in close co-operation with Royal Caribbean. The layout of the ship areas have been designed by the yard and the owner together with several highly reputed architects such as the Norwegian Njal R. Eide, - RCI Newbuilding Design, RTKL Snoweiss Design Group Tom Graboski & Associates, Morris Nathanson Design and Wilson Butler Lodge Inc. from USA - Tillberg Design and Arkitektbyrån from Sweden, - Design Team, Stephenjohn Design and London Contemporary Art (artwork) from the UK.

A Long Relationship

The relationship with Royal Caribbean dates back to the mid 1960's, when the cruise line's first ship, the 18,417 GT/725 passenger cruise ship Song of Norway was on the drawing boards. The yard in Helsinki built Royal Caribbean's first four ships, the Song of Norway (1970), Nordic Prince (1971) and Sun Viking (1972). The 1,400 passenger Song of America was completed in 1982.

Kulovaara noted that it took Royal Caribbean 15 years to reach 4,000 beds. As a comparison, the company added 5,500 beds ... in 2002!

Also, the yard lengthened both Song of Norway and Nordic Prince in the first such operation ever performed on a passenger ship. The yard also developed the concepts of the RCCL third generation (Sovereign-, Monarch-, Majesty of the Seas), fourth generation (Project Vision I & II and V & VI) vessels, of which Grandeur of the Seas and Enchantment of the Seas were delivered in 1996 and 1997 respectively, and developed the concepts of the recent Vantage and Millenium class ships.

Main particulars —Navigator of the Seas

Length o a	1 020 ft. (311.1 m)
Breadth max	161.1 ft. (49.1 m)
Breadth waterline	126 ft. (38.6 m)
Draft dwl	28.2 ft. (8.6 m)
Gross tonnage	139 300
Classification	Det Norske Veritas.
Passenger capacity, lower bed	3 138
Passenger capacity, max	3,807
Passenger cabins, total	1 557
Passenger cabins with view	1 077 (69%)
- of which with balconies	753 (48.4%)
- facing the Royal Promenade	138 (9%)
Crew capacity	1 213
Speed, service	22 knots
Machinery	Diesel-electric power station
Main Engines	6 x Wartsila 12V46C
Total power	75,600 kW
Total propulsion power	42,000 kW
Propulsion machinery 3 x 14 MW AZIPOD® propulsion, two azimuthing, one fixed	
Bow thrusters	4 x 3 MW, total 12 MW

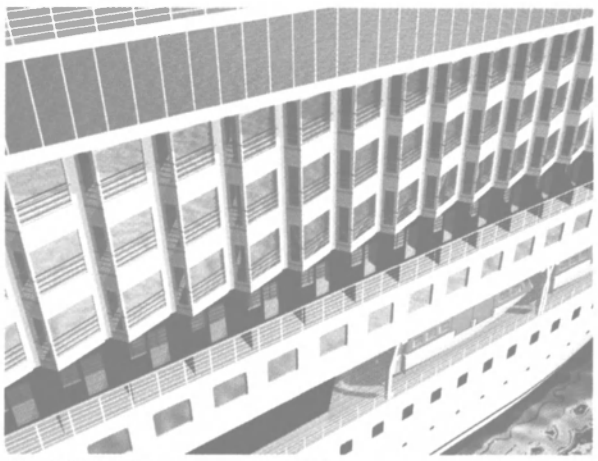
Some interesting statistics

Total main engine power	75 600 kW (102 790 hp)
Total electric power	73 800 kW (100 340 hp)
Propulsion power	42 000 kW (57 105 hp)
The total volume of the ship is about 450,000 cubic m (15,885,000 cu.ft)	
Total deck area	137,000 sq. m. (1,522,000 sq.ft.)

Plug and Play

Piikkio Works OY, an independent company 100 percent owned by Kvaerner Masa Yards, prides itself on maintaining a technical and design advantage in the construction, delivery and installation of prefabricated cabins for cruise ships. Bringing the saying "plug and play" to an entirely new level, the company coordinates nearly 150 subcontractors to design, build and deliver on-time, on-budget - up to 6,000 complete suites and staterooms per year.

Piikkio Works is owned by Kvaerner Masa Yards, and perhaps no greater testament to its system is needed than to note that its cabins are used by a host of other cruise ship builders, most notably Germany's Meyer Werft. With Kvaerner Masa Yards now under the Aker Kvaerner umbrella, it would seem that



The Piikkio Works Panoramic Cabin system, pictured here and below, offers unparalleled, floor to ceiling views. In addition, the (as yet not type-approved) system allows the cabins to be "plugged in" from outside, and secured into place using a patented system, reducing the time and cost of cabin installation.

the many Aker yards that build cruise and passenger vessels would take advantage of the Piikkio Works system. While Piikkio Works recorded a record turnover of more than $100 million in 2001, supporting its operations in Finland and abroad, it anticipates a turnover of approximately $60 million in 2003, with projections for 2004 and beyond quite cloudy, given the current cruise ship new construction hold. However, with its wide use of subcontractors, the manufacturer insists that the immediate effects of such a drop are minimal, though it (and many of its colleagues) would prefer a swift reversal.

Through its 20 years of building and delivering prefabricated units to the major cruise ship builders of the world, Piikkio Works has developed a number of innovations and installation techniques which are geared toward minimizing work for the shipyard. It fabricates its own panels in-house, in standard 900 mm widths, and has a constant eye on methods to bring more of the shipbuilding process out of the shipyard. It's latest innovation, patent-pending, is the Panoramic Cabin.

A View to Thrill

Piikkio Work's current line of modular cabins seems the ultimate in ease of installation, rolling onto ships, sans floors, and literally plugging into place. With its new Panoramic Cabin, a system yet to receive type-approval, the process is taken a step further.

With its new cabin system, the company delivers units that plug into the side of the vessel, literally forming a part of the ship's side structure, complete with windows. The product allows installation of a cabin with one crane lift, and eliminates the need for window installation by the shipyard.

As its name suggests, the cabin offers passengers a fabulous, floor to ceiling, forward and side view of the scenery, an amenity that the manufacturer suggests will allow cruise lines to garner additional revenue. While the new room does eliminate the balcony, it offers an additional two to four meters in the room, and would seem a natural fit for vessels that cruise in colder environs. Piikkio Works OY is currently working to develop the Panoramic Cabin with a balcony.

The concept was created primarily with the RoPax vessel type in mind, but its applicability to the cruise ship environment quickly became apparent.

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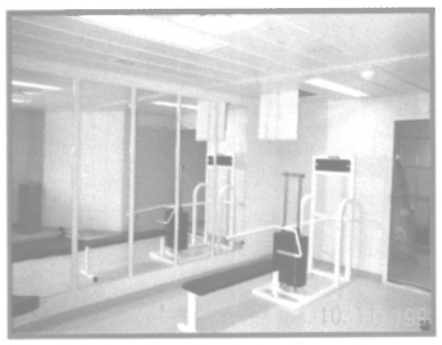


Bulkheads

Ceilings

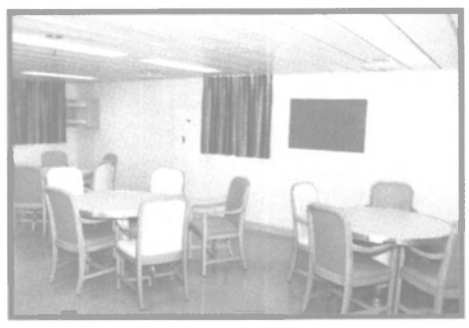
Doors

Food Service

Furniture

Furnishings

Wet Units



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Cruise Ship Design Trends Mirror Marine Marketplace

By Julie Parmentier, Senior Interior Designer; and George Selfridge, CEO Maritime Services Corp.

One of the recent major changes in marine interior design is that manufacturers have become aware of the needs of the marine market place. To support these requirements manufacturers have become much more aggressive in trying to get their product specified and tested to IMO standards. First tier manufacturers have realized that there is a large market for products in cruise ship design and manufacturing and that marine design is, by necessity, it's own separate market. Manufacturers realize marine interior designers are very limited in the product range that can be incorporated into marine design. The single biggest challenge for the marine interior designer is fulfilling client needs without sacrificing human safety or the design ambience the client wants to project to passengers. Manufacturers are now, more than ever, responding to this need with improved product range and response times.

As we all know, since Sept. 11, cruise ship companies have reduced capital budgets for new build and refurbishment projects. While this trend is slowly reversing it self, a large number of projects were — and are — on hold. There is evidence that this situation is starting to improve. The MSC estimating and interior design departments are now extremely busy quoting and designing projects that have a sure chance of being implemented in the near future. This resurgence of business has not only created the need for more manufacturers' products, but also deferred and reduced maintenance costs and refurbishment budgets over the last year mean that clients now want previously postponed projects completed at an increasingly faster pace. This is driving the second recent change in trends in interior design; teaming between manufacturers, designers, contractors and owners. The result is that design/build contracts are being used more often. Their use is being driven by the need to reduce costs while increasing the speed at which contracts, from inception to completion, can be executed.

A third trend that is linked to the need for faster project execution is the use of "on-call" interior design agreements. On-call agreements are set up between client and designer in anticipation of requirements for future design work. The terms and conditions of engagement are determined in advance of the requirement for interior design. When a need emerges for design services, there are no delays created by administrative requirements and the project can move ahead immediately.

Better Safe Than Sorry

Safety has always been a concern for Owners and operators. Whether driven by regulation, litigation or concern, a good portion of operational budgets have been and will continue to be allocated to safety functions. A thorough marine interior design must incorporate elements that incorporate and consider all of these concerns. ADA compliance is one of the most prominent concerns that consider regulation, litigation and concern for passenger comfort. Operators have tended to resist some ADA requirements. Good marine interior planning must, however, be responsive to these requirements and design accordingly. This recently emerging trend need not be driven by the desire of the owner, (i.e.) be a stated goal of the design, but, rather, should be effortlessly incorporated into the design of each new or refurbished space. In this case good design must incorporate sometimes conflicted requirements into a seamless design within which ramps, hand rails, turning radiuses, toilet facilities and the like must be designed to both regulation and good design principals. The "requirements" must disappear into, and become a part of a flawless design.

A smaller trend includes services related to recent technology and adding the creature comforts of home while maintaining the romance associated with cruising. Increased in-cabin services, the elimination of inside cabins in favor of outside cabins with balconies, cyber studies, rock walls, skating rinks and other high tech amenities continue to drive design in terms of form and function. Again the designer is faced with the question of incorporating advancing technology into a seamless interior design. How and where does a designer incorporate new e-mail stations into an existing public space layout and how can the design be blended into the surrounding spaces that will not be refurbished? Where does the flat screen television go? How will it be incorporated into the overall design? What affect will the addition have on existing wiring runs and access thereto, ventilation, traffic flow through the space, seating, wait staff considerations? What kind of services will be offered in passenger cabins? Historically, owners and operators wanted the passengers enjoying the amenities of the public area spaces. Not only are the requirements for public spaces changing, the passenger cabin is becoming more of a focus.

It's About Demographics

Demographic trends are also driving some changes. The traditional demographic lines dividing cruise ship pas-

senger are changing, and dividing lines between generations are becoming smaller. Most passengers cruising today are looking for the feeling of youth, therefore they will seek out engaging activities and adventure. Frequent cruisers are seeking alternatives to the port stops with all the look-alike vendors in the Tiki shacks — many selling the same trinkets in Ketchikan and St. Thomas. More often, the ship and the spaces within will become the focus — rather than the ports of call. Color and texture and the scientific and cultural use thereof can make a major impact on how people make use of and relate (favorably or otherwise) to the space they are in. As the ship becomes more of a focal point for the cruise holiday the requirement for spatial integration, wise use of color, variety and ease of movement become paramount requirements for the responsive interior designer.

Ceilings and bulkheads, from a regulatory standpoint, have not changed much over the recent past, but designers have new ways to take the most commonly used materials, such as lineal plank and standard 600 x 600 mm tiles. To brighten bulkheads there are the standard foil type coverings that come with ships bulkhead system as well as highly decorative solid core systems. Each has to be used where appropriate, sometimes in conjunction with each other.

Historically the color range in "soft core" systems has been limited, however, more wall vinyl companies are and have tested their vinyls to IMO standards.

About the Author

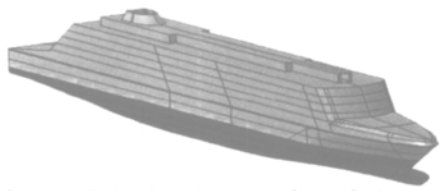
Julie Parmentier has worked in the interior design field for 15 years, the past eleven of which have been as a marine interior designer. She began her education in architecture at the University of Colorado, and received a B.F.A. in Interior Design, from Cornish College of the Arts, in Seattle, Wash.

Parmentier has worked at Maritime Services Corporation's design department since its inception in 1995. She works primarily on casino boats, cruise ships, dining vessels and ferries. The department's emphasis is on Design-Build projects, though MSC' designers also work as liaisons between a client's designer and MSC' construction staff. Maritime Services Corp. (MSC) specializes in refitting cruise ships as well as in new building projects. Using specialists from all over the world, MSC provides the cruise industry with world wide service from seven offices in three countries.

MSC, headquartered in Hood River, Ore., has satellite offices in Seattle, Wash.; Crown Point, Ind.; Fort Lauderdale, Fla.; Cape Canaveral, Fla.; Freeport, Bahamas; and Southampton, U.K.

Deltamarin Expands to China to Thwart Cruise Downturn

Finnish design specialist Deltamarin is synonymous with advanced cruise ship design and construction. The company, as has many of its colleagues in this country, have built a formidible empire of accrued cruise shipbuilding knowledge and experience which it has used to remain a key player in the international cruise market. But as the cruise industry stumbles, so too do the myriad of companies which serve it. While an extended downturn is not generally forecast, Deltamarin must find new business to keep its 320 employees busy and its sales at or near its 2001 mark of nearly $26 million. To do this, it has trained its sites on expanding both regionally and by vessel niches served, with a move to China fulfilling the former and a renewed focus on offshore, megayachts and chem carrier sectors to fulfill the latter.



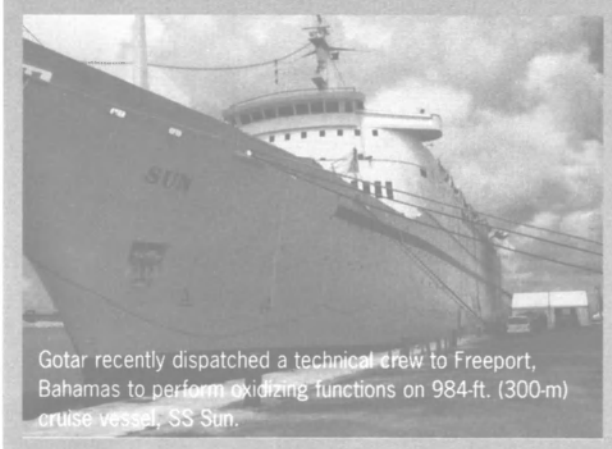
Deltamarin continues to evolve its business in the face of a cruise ship buying downturn. It offers everything from basic design to life cycle management.

In assessing its immediate business prospects, the company sees China as a perfect fit for extending its Basic Design end of its business, an area that accounted for 22% of its turnover in 2001. In China, we would like to become the preferred consulting and naval architecture firm for western owners building advanced ships, said **Markku Kanerva**, the company's director of business development. The company currently has a representative in Shanghai, but has plans to open an office in China "very soon."

The company seems well on its way to fulfilling the vision, with burgeoning business in China. DeltaMarin is involved with the construction of a series of six 8,000 dwt RoRo paper/trailer carriers for Nordic Forest Terminals (Sweden) under construction at Jinling Shipyard in Nanjing, China. The project to build the 528-ft. (160.5 m), 20-knot, 12,600 kW ships was begun three years ago. More recently, Deltamarin signed a contract with Jinling for design work on the 5,200 dwy high heavy vehicle/RoRo car carrier to be built for SeaPlane One of France. SeaPlane One is a joint venture of Louis Dreyfus Armateurs from France and Leif Hoegh ASA of Norway. For this project — a 492-ft. (150 m), 21-knot vessel — Deltamarin will prepare for the yard the complete basic design for general, hull, outfitting, accommodation, machinery and electric, including approvals. The vessel is specially designed for carrying aircraft parts fabricated in different countries in Europe for Airbus A380 planes, which requires a specialty vessel offering low humidity in the cargo spaces and good seakeeping.

Circle 33 on Reader Service Card

Gotar: Keeping Ships Clean From the Inside



Gotar recently dispatched a technical crew to Freeport, Bahamas to perform oxidizing functions on 984-ft. (300-m) cruise vessel, SS Sun.

With a number of recent disease scares aboard cruise ships, the mandate to get and stay clean is monumental. Therefore, companies such as Gotar Technologies have begun to focus more and more on the motto of which they are based, "Perfect chemical solutions for a perfect world."

The company, whose headquarters are based in Quebec, Canada, also operates an R&D Production unit out of Saguenay, Quebec, and a U.S. office in Houston (Friendswood), Texas. Manufacturing a diversified variety of cleaning products with a large range of applications, the company features a selection of products, such as deoxidizers that eliminate lime and calcium buildup; degreasers that remove organic matter, oil residues and carbon deposits; and other formulas developed for a variety of metal surfaces.

Gotar's products are touted as non-toxic, biodegradable and cost-effective, while extending equipment's life cycle. The Gotar product that has received the most coverage recently is Gotar D - a deoxidizer, descaler, which dissolves calcium, lime and other corrosive materials from steel, copper alloys and iron. The product was approved late last year by the U.S. Navy for use as its exclusive deoxidizing cleaning agent on its surface fleet. Formulated to seek out ferrous and non-ferrous oxidation, corrosion and lime, Gotar D is similar to the company's Gotar AL, which is just as effective as a deoxidizer and descaler, but is designed for safe application on light metals, such as aluminum, magnesium and tin.

Regarding Gotar's degreasers and emulsifiers, these products are designed to attack oil residues, synthetic oils and grease, as well as carbon deposits. Gotar DG completely dissolves organic materials, such as algae, mud and silt, in heat exchange systems, while Gotar DGS is tough on synthetic lubricants, baked-on carbon and oil residues caused by friction. In addition, Gotar AGS delivers the same effective degreasing properties as DGS, but is better suited for light metals.

On the commercial side, mainly the cruise shipping niche, Gotar recently sent a technical crew to Freeport, Bahamas to perform various deoxidizing functions on cruise vessel SS Sun. The 984 ft. (300-m) ship, which was built in France in 1964 at the time was undergoing a complete refit by its manager, International Shipping Partners, tapped Gotar to decalcify critical equipment such as evaporators, cooling systems, heat exchangers and boilers.

Using 10,000 liters of Gotar D, the deoxidizing was performed within the equipment (containing 800 tubes) with a 15-hp pump in a closed circuit operation. With more than 2,000 liters of Gotar D used to fill the 30 x 16-in. exchanger, the entire process was completed successfully within four hours.

Another answer to a problematic situation by Gotar was performed on Groupe Desgagnes' vessel N/C Melissa Desgagnes, which required a clean up of its cooling system. Subsequent to coupling hoses on the entry and outflow of the vessel's cooler, Gotar D was circulated by maintaining a cycle that alternates rest periods and circulation periods during three hours — enabling Gotar engineers to clean thoroughly the inside of the cooler.

Circle 34 on Reader Service Card

Coral Princess Debuts With Unique Propulsion System

Coral Princess' propulsion system is the first in the cruise industry to fully utilize a new development of the diesel engine known as an EnviroEngine, as well as the first in the Princess fleet to incorporate gas turbine power generation. This innovative combination uses technology proven to be both highly efficient and environmentally sound, and, in a unique design development where the gas turbine is installed in the ship funnel, provides additional space for a wider range of public rooms and onboard facilities.

Coral Princess is powered by one gas turbine that operates in conjunction with two diesel EnviroEngines.

The turbine replaces at least two diesel engines and by using two separate power systems, this unique one-of-a-kind configuration is designed to create a reliable and safe energy source.

Described as the most environmentally friendly and economical way of using fossil fuel for power production, the EnviroEngines, manufactured by Wartsila, were developed in close cooperation with P&O Princess Cruises.

Representing state-of-the-art diesel engine technology, EnviroEngines employ common rail fuel injection technology that results in smokeless operation, producing a clear engine exhaust and direct water injection to reduce NOx.

Princess is also the first cruise line to install a gas turbine in its ships' funnel; a positioning that creates a technological challenge never before undertaken. This unique placement frees up significant additional passenger space — used to incorporate more public features into the ship's design. As a result, Coral Princess passengers will enjoy the benefits of two lower decks dedicated to public amenities where most other ships offer only one.

Circle 24 on Reader Service Card

Sick Ships, Project America and a Merger


Project America leaves Pascagoula.


Sen. John McCain, (R-Ariz.)


Micky Ari[illegible], CE[illegible] Carnival Corp.


Peter Ratcliffe, CEO, P&O Princess

2002 will surely not be counted as "a banner year" for many, if any, industries, particularly not for the leisure and travel niche. The cruise industry survived a tough year, as terrorism, a shakey economy and sickness outbreaks onboard ships grabbed headlines. But it is important to note that the industry did survive. Cruise lines were not as profitable as years past, but last year's challenges present future opporunities.

By Regina P. Ciardiello, managing editor

The end of 2002 closed out with a broken merger agreement between P&O Princess and Miami, Fla.-based Royal Caribbean, which, if completed, would have tallied up to a $6 billion operation. Taking the industry surprise in November 2001, the two companies even managed to keep their trade secret from the industry's powerhouse — Carnival Corp. Admittedly not having any idea that the two lines planned to form RCP Lines, Carnival, for the next several months of 2002, worked diligently to convince, the management team at P&O Princess, namely CEO **Peter Ratcliffe;** and CFO **Nick Luff,** that the better deal was with the company who seems to crank out a new "Fun Ship" as often as the sun shines in Florida. While it seemed at first that P&O was firm with its commitment with RCCL, the company eventually succumbed to the "lair of Carnival Corp." ultimately severing its tentative agreement with RCCL almost one year to the day that Ratcliffe stated just the opposite regarding a possible union with the line. In an article published in the December 2001 edition of *MR/EN* (See "6 Billion Merger Tightens Cruise Industry, page 22), Ratcilffe reportedly said, "A combination with Carnival for virtually anyone in the industry is problematic because of anti-trust issues." On October 25, 2002, however, those words became a distant and virtually forgotten memory, when P&O announced its decision to sever its tentative agreement, as well as the future of RCP Lines. Risking the threat of having to pay a $62.5-million break up fee (which P&O is expected to pay during Q4, according to P&O Princess Public Relations Manager, **Caroline Keppel-Palmer**), the company, which confirmed its decision at the start of the new year, decided to go with Carnival Corp. when the P&O board announced that it had recommended the Carnival DLC transaction. Keppel-Palmer also mentioned that while P&O will be expected to pay the $62.5-million fee, the company was able to "exit the joint venture at no cost."

Upon completion of this merger, P&O Princess will operate under the new name of Carnival U.K.

While the agreement between P&O and Carnival has been confirmed, it is not set in stone, as shareholder must now decide, a decision to be made at meetings to be held during the months of March and April. According to a statement issued by P&O Princess last month, the company's chairman, Lord Sterling, stressed that the line will undoubtedly seal the deal with Carnival Corp. "We (P&O Princess) have today (January 8, 2003), signed an agreement with Carnival to implement the DLC transaction." He continued: "We are recommending that shareholders approve the DLC transaction with Carnival at an EGM expected to be convened towards the end of March."

Getting the Bugs Out

Another issue that plagued the cruise industry at the end of this year was several instances of gastrointestinal viruses cropping up. Throughout the summer, and into the late fall, passengers leaving from various ships, would mysteriously begin to suffer from chronic vomiting and diarrhea after setting sail. It was later determined after full investigations by the Centers for Disease Control and Prevention (CDC) that these stricken passengers, most of whom boarded ships leaving from the Port Everglades, Fla., had been exposed to Norwalk Virus. The illness, whose symptoms include nausea, abdominal pain, as well as the chronic vomiting and diarrhea that had plagued the stricken passengers, was not being spread through food preparation, but rather through infected passengers and crew, who had already been exposed to the germ, and would then carry the virus onboard with them. The highly-contagious virus, which did not favor one particular cruise line,

cropped up on P&O's Oceana; Holland America's Amsterdam and Ryndam; Disney's Magic; Carnival's Fascination; and Radisson Seven Seas' Mariner.

Project America — The Saga Continues

Just when it seemed that the end of this "project" had been finally put to rest, another issue arose. To refresh, the two vessel that were to comprise the now-defunct U.S. Lines, were hyped by parent company American Classic Voyages (AMCV), as "The first U.S.-owned, operated and crewed cruise ships in 40 years."

With the backlash of 9/11 and a sour economy, AMCV was forced to file for bankruptcy on October 19, 2001, leaving the hulls of the incomplete vessels to rust away at their builder, Northrop Grumman Ship Systems in Pascagoula, Miss. After much fanfare, Norwegian Cruise Lines, purchased the vessels, as well as all of the materials and equipment from the yard this past August, where everything remained until they were towed to Lloyd Werft in Germany. The Bremerhaven-based yard is in the process of finishing the construction of the first Project America ship (scheduled for delivery in 2004), and is slated to complete the second vessel as well.

While it may sound as though this is just another vessel construction for NCL, it actually has caused headlines in recent weeks when Sen. **Daniel Inouye,** (D-Hawaii), announced his intention to "bring back" the vessels to the U.S. Since the two cruise ships will be completed in a foreign yard and owned by a company whose parent is based in Malaysia (Star Cruises), technically according to the Jones Act, they would not be able to cruise between domestic ports. "This provision builds on the original Project America statute to allow a U.S. company employing American workers to operate those ships under U.S.-flag in Hawaii." Sen. Inouye said. "I believe this is the best way to implement the original economic and national security goals of Project America, including the creation of approximately 9,000 jobs on and off the ships, and providing a needed boost to Hawaii's economy."

With the intention to hopefully rebuild U.S.-flagged cruise vessels, Inouye also proposed to allow Norwegian permission to have the vessels fly the U.S. flag for the Hawaii trade. In addition, the new vessels are expected to create approximately 3,000 new jobs for Americans. The vessels must also abide by U.S. laws including taxation, labor and environmental laws and be owned by U.S. citizen corporations.

While Inouye is confident that his proposal will go through, one of his colleagues, Sen. **John McCain** (R-Ariz.) is less-than-thrilled by this legislation. Known for his strong objections to the Jones Act, it would seem that McCain would welcome Inouye's proposal with open arms. But rather he is staunchly disagreeing with the Project America Provision, namely that an exception should not be made for just one company. "As many of my colleagues know, I am no fan of the protectionist laws that require domestic cruise ships to be U.S.-owned, U.S.-built, U.S.-flagged and U.S.-crewed," McCain said. "However, I strongly object to waiving these laws for only one foreign-owned company."

Proposing an amendment to strike the "special interest provision in the Omnibus," McCain's request was deemed unsuccessful since the Bill cleared the Senate on January 23, merely six days after Sen. McCain first announced his stance on this issue.

A 360°

The evolution of podded propulsion systems has gained steam in recent years, as a number of notable new systems have entered the market with new options. The era of podded propulsion is here and now, and despite some technical glitches with the systems - notably faster than anticipated bearing wear - it is safe to assume that the system's popularity will only grow with experience.

Pods, obviously, are not the single solution for every marine application. As with any other technology, limitations exist. However, podded propulsion solutions have opened more marine technological avenues than they have closed as **Harri Kulovaara**, senior vice president of fleet operations and newbuilding, Royal Caribbean, explained upon the introduction of Navigator of the Seas, the cruise line's fourth ship in the mammoth 138,000-ton Voyager class. "We could not operate a ship this large using only two propellers," said Kulovaara. "The pods are essential ... without them, the maneuverability would not be there."

Navigator features three azimuthing electric 14 MW Azipod units, two that are fully azimuthing with one fixed centerline unit.

Pushing and Pulling

The advent of podded propulsions for shipboard applications started with Kvaerner Masa-Yards, the Finnish Maritime Administration and ABB Industry of Finland, which developed a new electrical propulsion system for icebreakers, the trade name of which is Azipod. The first vessels equipped with the new system, the 16,000 dwt tankers M/T Uikku and M/T Lunni owned by Fortum operated Nemarc Shipping, have now, combined, nearly 100,000 hours of operation experience, and the vessels have, for example, several times successfully navigated through the North-East Passage in extremely harsh conditions.

Since then, the Azipod propulsion system has been installed on the Finnish icebreaker Botnica, the icebreaker Svalbard, which was recently built for the Norwegian Spitzbergen, two icebreakers built by Masa-Yards for the Caspian Sea as well as the icebreaker Mackinaw, which is under construction for the Great Lakes of the United States.

The podded solution aboard the icebreaker niche is particularly notable, as it allows the vessel to efficiently perform other duties in the off-season, versus traditional vessels that might simply sit idle. In the case of the Finnish icebreakers, their "off-season" is hardly that, for when the ice finally melts, they are re-positioned for rigorous duty as offshore support vessels in the North Sea.

SSPA Sweden was contracted to carry out comparative maneuvering simulations for alternative hull shapes for the new Great Lakes Ice Breaker (GLIB) Makinaw, two which were tested in Masa-Yards Arctic Research Center (MARC) and two in SSPA's open water laboratories. Exhaustive testing confirmed the excellent maneuvering characteristics expected with the Azipod system, but moreover, as SSPA's Hans Liljenberg wrote, the GLIB's course keeping - which SSPA has sometime found to be a problem with thruster and pod propulsion - was performed well in this case. In addition to its ice breaking duties, Mackinaw, from Spring to Autumn, will be responsible for open water duties such as buoy tending, oil spill management, and search and rescue.

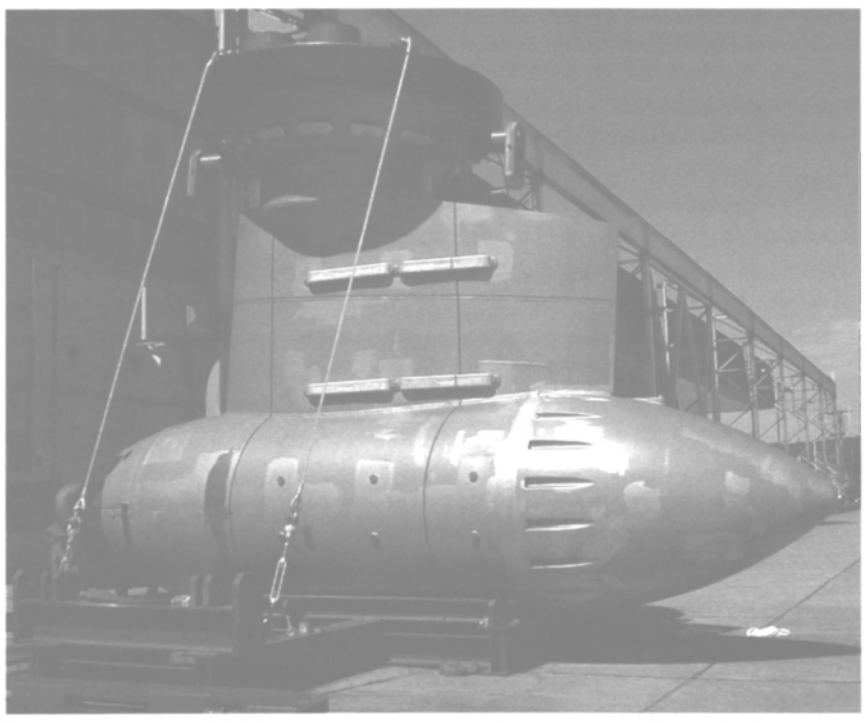
Through real world experience and continuous R&D, the shipyard has shown that vessels with a podded drive are capable of breaking ice with a considerably higher efficiency than before, when moving backwards with the propeller first. Based on this observation, a new type of a combination was developed in which the vessel travels back to front in the most difficult ice conditions; at the same time, the design of the bow can be optimized for navigation in open water. This concept - DAT - was developed by Kvaerner Masa-Yards, and now its first reference is in service.

The culmination: the 105,000 dwt M/T Tempera - one of *Maritime Reporter's* "Great Ships of 2002" - built in Japan for Fortum Shipping. In open water, the vessels can reach a speed of 17 knots, and thanks to their efficient icebreaking capacity that can be achieved while running with stern first, they are entitled to the highest IA Super Ice Class with their engine power of 16 MW, while even 25 MW would be required for this, using conventional technology.

As fundamental as the question of incorporating an podded propulsion solution is, so too now is the manner in which it is asked to act, namely will it push or pull. The Ulstein Aquamaster pulling azimuth thruster from Rolls-Royce is said too, in the case of an innovative product tanker design, provide

Swimmin' With the Fishes

STN Atlas, Wärtsilä Propulsion "Dolphin" Pod Proves Popular



Jointly developed by STN Atlas Marine Electronics and Wartsila Propulsion, the Dolphin podded system is for vessels designed for high speed and good maneuverability and power requirements extending from 5,000 MW to more than 20,000 MW. With a continuous rotation angle of 360 degrees around the vertical axis, pods ensure optimum maneuverability. The standard drive of the fixed pitch propeller is a six-phase air-cooled synchronous motor, with gears of a conventional thruster being replaced by a low-speed motor directly coupled to the propeller. A fixed pitch propeller is used with industry-standard lip seals for its propeller shaft. Advantages of the system are elimination of a shaftline, rudder, stern thrusters and reduction gears, as well as enhanced electrical and hydro-dynamic efficiencies, lower fuel consumption and reduced exhaust emissions. Noise and vibration effects are similarly reduced.

STN Atlas recently delivered and installed the first two Dolphin podded propulsion systems aboard Seven Seas Voyager, the new 49,000 gt cruiseliner built by T. Mariotti at its Genoa yard for V. Ships Leisure/Radisson Seas. The vessel commenced sea trials in December 2002 in readiness for delivery in March 2003. Each Dolphin system provides a power rating of 7,000 MW at 170 rpm.

similar costs to conventional solutions, but with more flexibility and safety benefits.

Rolls-Royce's new NVC-Design concept is an up-to-date product tanker design in the 3,000 to 15,000 dwt range, powered by a pair of medium speed engines directly coupled to two Ulstein Aquamaster pulling azimuth thrusters, known as Azipulls. The unit's first work in service will be aboard two new Fjellstrand FerryCat design ferries, which have been ordered by the Istanbul Seabus Company in Turkey and are scheduled for delivery in early 2004. Each ferry will feature four 1,500 kW Azipulls, one on each corner of the vessel.

Azipull thrusters use proven gear transmission technology and a pulling controllable pitch propeller. The leg and lower gear housing are of a streamlined section and incorporate a fin, providing some rudder effect and raising efficiency by recovering much of the swirl energy in the propeller slipstream which is otherwise lost. Azipull thrusters have also been ordered as main propulsion units in an offshore service vessel.

Together Siemens Marine Solutions and Schottel developed and provide the Siemens-Schottel Propulsor system (SSP). The two companies re-affirmed their partnership just last summer, and announced that they will be adding systems with outputs of less than five MW to their present range, making the SSP available for smaller vessels and for the platforms and supply vessels of the offshore industry.

Dubbed Schottel Electric Propulsor (SEP), the system is already marketed by Schottel and will be equipped with Siemens permanent-magnet motors. These smaller pod propulsion systems are especially suitable for vessels that do not need high power ratings and for the platforms and supply vessels of the offshore industry where good maneuverability is crucial.

SSP pod propulsion systems references include the chemical products tanker Prospero operated by Swedish owners AB Donsotank, since October 2000, and the ferry Nils Holgersson.

To develop a new marine propulsion system based on the pod concept, Alstom joined with Rolls-Royce — a world leader in marine propulsion.

The joint developmental effort combined Rolls-Royce hydrodynamic know-how with Alstom's expertise in marine engineering, electrical propulsion, propulsion motors and generators, and led to the introduction of Mermaid, a unique design which uses a minimum of mechanical parts to optimize available vessel space, ensure greater reliability, and reduce mounting time.

The manufacturer says that optimization of the shape, positioning, and angle of Mermaid in relation to the ship-allows an increase in efficiency of up to 15 percent versus conventional propulsion solutions.

For more information on the companies referenced in this story, please circle the appropriate number on the Reader Service Card in this edition.

M/S Zuiderdam: Modern With Elegant Taste

Taking a moment to think back to when Holland America Line (HAL) first announced the formulation of the new Vista Class at the Sea Trade Cruise Shipping Show in Miami, Fla. in March 2001, it is almost as though we are living in a different world. The cruise industry was booming, there was no such thing, as the Office of Homeland Security and the threats of terrorism seemed only real in distant lands. One thing is the same, however, and that is that despite all these obstacles — both financial and political — HAL stood its ground to work with Fincantieri to build a vessel class like no other - both on the technical and design fronts. MR/EN *had the opportunity to explore the premiere vessel of this class — MS Zuiderdam — inside and out during its preview cruise this past December.*

By Regina P. Ciardiello, managing editor

Departing from the Port Everglades, Fla., MS Zuiderdam set sail for the second of its three preview cruises. Steaming toward Half Moon Cay in the Bahamas, the vessel was also in the process of fine-tuning its inner workings. While Zuiderdam successfully completed its sea trials in Italy this past July, its sistership, Oosterdam was in the midst of construction at Fincantieri's Trieste yard for delivery this coming June. **Pieter Rijkaart**, HAL's director of newbuildings, took the time to point out the ship's innovative features, chief among them the ship's CODAG (Combined Diesel Electric and Gas Turbine) propulsion system, consisting of five Wartsila engines (3 x 11,520 kW and 2x 8,640 kW) and one GE gas turbine. Employing an Azipod pod propulsion package, the vessel can move at speeds of 21 knots. While the ship has two engine rooms, the entire operation is based out of one control room. Hosted by **Willem Berends,** chief environmental officer, we were able to view the vessel's main switchboard operated by Second Engineer **Bart de Bruin,** who demonstrated the control room's ability to operate both engine rooms. "The main switchboard on Zuiderdam is redundant," Berends said. "There is one control room onboard this vessel with the gas turbine housed in its own separate area."

While the 936-ft. (285.2-m) vessel

will be powered mainly with its Wartsila diesel package, there will be times, according to Berends, when it will be necessary to employ Zuiderdam's GE gas turbine. Unlike recent newbuilds, (such as Celebrity's new Millennium class introduced in 2000), the Vista Class vessels will not be powered solely by the gas turbines. Rather

MR's managing editor, **Regina P. Ciardiello** had the opportunity to tour Zuiderdam's innovative bridge room courtesy of Captain **Jack van Coevorden**.

Zuiderdam's environmental officer, **Willem Berends** provided a tour of the engine room. ***(Photo Credit: Regina P. Ciardiello)***

than operating on the turbines as the main source of power, the vessel will kick into gas turbine mode when traveling into environmentally sensitive ports, such as Juneau, Alaska. "At sea, we will employ three diesels," Berends said. "While the gas turbine is cost effective, it will be used in places such as Alaska so that we can properly comply with 'green ship' and environmental regulations."

Another measure that Berends pointed out regarding the use of the diesel and gas turbines at the same time is the issue of an emergency situation — particularly in the vessel's engine room. Granted that if a fire were to occur in one of the vessel's engine rooms, the ship could function off its auxiliary power utilizing the diesel engines. The reason for this, according to Berends is merely one of "safety first," since diesels can kick into gear in just one minute — a gas turbine could take almost seven minutes to start up - therefore it would be a safety issue to use both at the same time.

Moving up to the vessel's bridge room, we had the opportunity to meet with the man at the head of Zuiderdam's controls - Capt. **Jack Van Coevorden**, who has been working on HAL cruise vessels since 1972. Van Coevorden, who was born and raised in Indonesia, chose to be a Dutch national in 1951, and following his graduation from high school worked on cargo ships before moving over to the cruise sector.

With all of the electronics equipment supplied by STN Atlas, the bridge also features a GPS by Leica, satellite communications by MTN and GMDSS via Sailor. Van Coevorden also points out that Zuiderdam, as well as all Holland America vessels, employ a separate "safety center" in the bridge area, consisting of fire control equipment, fire doors and the HI-Fog sprinkler system. In addition, smoke detectors can be heard in each individual stateroom with yellow flashing lights for the hearing impaired should a fire occur onboard - a first for the cruise industry.

A "Waste" of Time

A state-of-the-art wastewater system by Rochem and incinerator by Scanship for the removal of Zuiderdam's waste products was a bold move by HAL and Fincantieri, who traditionally employed the Zenon system onboard its vessels. Environmental officer Willem Berends had nothing but positive feedback regarding the decision. "So far we are happy with the yard (Fincantieri) deciding to use the Rochem system," Berends said. "On this vessel, we employ a system that is of drinking water quality after the first stage of treatment." Despite this claim, however, HAL opted to treat the water a second time, via a reverse osmosis process, just to be 100 percent sure that the gray water is indeed of drinking water quality. The filtration system designed for this process that treats both accommodation gray water and laundry water, utilizes membrane separation with Rochem UF FM membrane module. According to Berends, "Rochem supplies low pressure reverse osmosis (LPRO) systems to properly treat the gray water and treated black water to provide assurances that the treated water can be discharged."

The Rochem FM Module system, which was designed for the purification of gray water according to IMO regulations, has a nominal total recovery of 85 percent, meaning that the supplied quantity of gray water is dispersed into 15 percent waste water and 85 percent clean water. The system's patented membrane design also avoids

the usual problems associated with fouling and plugging resulting from biological activity and suspended solids.

Scanship Environmental was chosen as the supplier of Zuiderdam's incinerator system, removing dried food waste and sludge oil.

Moving over to this area of the vessel's engine room was less than pleasant as we were unfortunately able to view the remains of what was served for dinner the previous evening.

Since HAL has a strict recycling policy, items such as aluminum cans are disposed of onshore, while the incinerator mainly deals with the disposal of dried garbage and food waste. Consisting of seven areas: incinerator, dry garbage silo, dry garbage silo with dried food waste section, ash handling system, flue gas system, incinerator control cabinet and dry garbage shredder, the Scanship incinerator consists of an intermediate feeding section, primary combustion chamber and secondary combustion chamber working to fully automate incineration of shredded garbage, food waste and sludge oil.

Renowned interior designer **Frans Dingemans** adds his magic touch to Zuiderdam's specialty restaurant — The Odyssey.
(Photo: Christina Lombard, Elliott Bay Design Group)

A Touch of Modern Elegance

Keeping with the tradition of employing their exclusive interior designer, **Frans Dingemans**, HAL wanted to create an atmosphere of intimacy so that passengers would not feel overwhelmed by a large vessel. Dingemans, who is managing director and owner of VFD Interiors based in Utrecht, The Netherlands, stressed during his ship tour his desire for "modern elegance with classic style. "The ship's scale is one of intimacy, as though you are not on a big ship," Dingemans said. "This vessel is unique - there is no other ship with this sort of design floating around."

Dealing with a vessel of this magnitude (936 ft. (285.2 m) with a breadth of 106 ft. (32.2 m)) was undoubtedly a daunting task for Dingemans and his team to exude a motif of intimacy and simplicity. Dingemans and his design team fulfilled HAL's request to "appeal to a younger crowd while still maintaining the line's reputation of elegance."

"People are retiring earlier, especially the baby boomers," Dingemans said. "Therefore the market is calling for a more modern look that is more attractive for a younger crowd." The vessel's two dining rooms provide the idea that passengers are actually dining in their own private area. Rather than give off the notion of one large room, the Vista Dining Room is portrayed as "several small dining rooms". Dominated by wood and various hues of burgundy and red, the dining chairs are backed with leather-prints of 17th Century paintings of flowers, while the ceiling is covered with large gold and red-colored flowers or "Fleurs de Mer," created by ceramic and glass artist **Barbara Nanning**. The artwork is actually several pieces suspended from the dining room ceiling — without visible support.

Marine Fender

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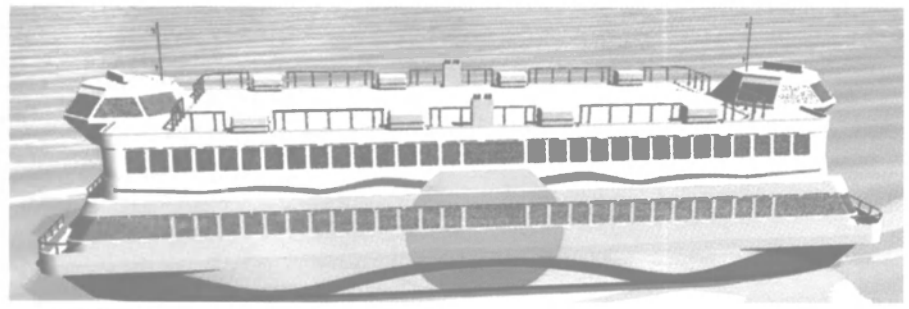
Construction on 10-Boat, $57-M Contract Commences for Brazil

While much of the attention in the fast ferry niche often falls on designs and construction from Down Under, Italy's Rodriquez Cantieri Navali has built and maintained a stable of some of the most impressive high-speed vessels in the world. It's South American affiliate, Rodriquez Cantieri Navali do Brasil SpA, recently commenced construction of seven Catamarans CityCat 52 DE model and three catamarans CityCat 29 model for the home market.

The Brazilian ferry project is a unique one for the 115-year-old company in that all of the ferries will be built in Brazil, resulting in Rodriquez Cantieri Navali setting up a company there. It has subcontracted out the business to three separate facilities: one to build the hulls, another to build the superstructures; and another for final assembly; to keep the project on track.



Unique Ferry for Unique Environs

Delivery of the Double-ended ferries to Barcas (hence the "DE" designation) will start with the completion of the first 52 DE in a year, with subsequent vessels following in scheduled three-month intervals.

Barcas (www.barcas-sa.com.br) transports more than 80,000 commuters every day and the route is considered a lifeline to get the employees from their homes to their offices.

The 52 DE is designed for operation on the 2.7 n.m. route between Rio de Janeiro and Niteroi. The unique nature of the route and existing shore based facilities, along with the fact that up to 1,200 passengers will be simultaneously embarking or disembarking from the CityCat 52DE, extensive studies were made to ensure that the stability of the vessel would be maintained under all conditions.

The new CityCat 52DE catamarans can accommodate up to 900 passengers sitting and 300 passengers standing. To rapidly embark and disembark the passengers, the vessel will be bow loaded from either end through a full width entryway.

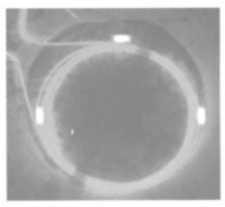
The propulsion system, consists of two MTU 8V2000M70 diesels, each located in a central "third hull" and coupled to a dedicated azimuth propeller, which will provide for a service speed of about 18 knots. In addition, the third hull (one at either end) will provide additional reserve buoyancy during passenger loading periods. The azimuthing thrusters have been designed and developed by Rodriquez Marine Systems and operate in such a way that they completely eliminate the need for bow thrusters.

The 28 will go between Rio de Janeiro and Charitas, a slightly longer route but with fewer passengers, hence the higher speed and lower capacity of the latter.

Circle 4 on Reader Service Card

Transit Lights the Way

Intenslite International Ltd. developed a unique Emergency Escape Path lighting system dubbed Transit that has proven visible even in the densest of smoke.



This product is a side emitting fiber optic rope lit by a compact green laser, which can illuminate up to a distance of 100 yards. If a laser is placed at each end then 200 yards is achievable. The power consumed is no more than 14 watts. Transit was initially designed for the offshore market as an LLL (Low Location Lighting), or Emergency Escape Path lighting system. Using light only in the fiber optic rope makes this system intrinsically safe as there is no electricity in the path. It has proved to have many other uses than offshore, as it may be used underwater.

Circle 25 on Reader Service Card

DynaSamp Fluid Is LR Type Approved

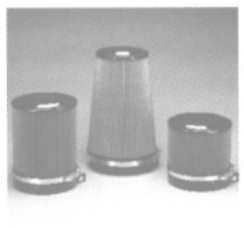
FRAS AS' patented DynaSamp Fluid sampler/injector has been Type Approved by Lloyd's Register (LR).

The DynaSamp Fluid sampler/ injector is the first device to be Type Approved by LR for hydraulic oil, lubricating oil, fuel oil, thermal oil, water, steam, process fluids/hydrocarbon and AVCAT (aviation turbine fuel).

Circle 2 on Reader Service Card

New Silencers on MTU and MAN B&W Engines

Walker Engineering has released its new EverQuiet line of High Performance Air Filter Silencers for MAN B&W and MTU diesel engines.



The units feature an all-new, compact design that incorporates a built-in silencer to help reduce turbo whine. In addition, the units present a washable air filter in an exclusive Walker "spring-less" filter base. The advanced design allows quick and easy filter detachment for washing or replacing elements. No turbo connection hose is required to install the units.

Circle 21 on Reader Service Card

Tribon.com Extends Beyond 100K

The 100,000th product has been published on Tribon.com for access by shipyard designers and design agents globally. Jastram GmbH & Co KG based in Hamburg was the company with the 100,000th product.

New Console for Transas GMDSS Simulator

Transas has redesigned the TGS-4000 GMDSS Console intended for operation with its TGS-4100 GMDSS simulator software.

The modern look of the new hardware solution and its compact dimensions, which are now 475 x 255 x 78 mm (W x H x D), differentiate it from the previous console model.

The new TGS-4000 Console comprises S.P.Radio control panels, including VHF with DSC Sailor RT4822, MF/HF with DSC Sailor HC4500, INMARSAT-C SES Sailor H2095B, and Battery Panel Sailor BP4680. The delivery set includes a separate Sailor Alarm Panel AP4365 connected to the Console via specially supplied cable.

Circle 27 on Reader Service Card

Trailer Bridge Gets Patent

Trailer Bridge, Inc. said that the United States Patent and Trademark Office (USPTO) has awarded a patent related to the method of loading vehicles in and unloading vehicles from Trailer Bridge's previously patented Vehicle Transportation Module (VTM) container. Trailer Bridge was informed by the USPTO that Patent No. 6,503,034 was issued on January 7, 2003. Previously, Patent No. 6,416,264 was awarded on July 9, 2002 to Trailer Bridge as assignee for the invention of the Vehicle Transportation Module (VTM) container.

The inventors of both patents are **Ralph W. Heim, J. Edward Morley** and **P.W. Shahani**. Mr. Heim is President and Chief Operating Officer of Trailer Bridge and Mr. Morley is Vice President of Operations. Mr. Shahani is a consulting engineer who has provided services to the Company.

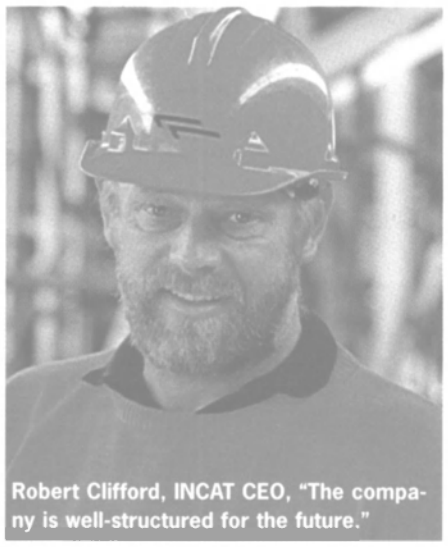
The method of loading and unloading automobiles that is being patented includes locating the VTM container on an external surface, driving the vehicles from the external surface into the VTM container and then securing the vehicles inside.

Q&A

INCAT — A Delicate Balance for the Future

Rising out of the ashes of receivership, Hobart, Australia-based INCAT is back with a vengeance. After a setback this past year, the company, according to CEO ***Robert Clifford,*** *is "well structured for the future." And the company is on its way to a speedy recovery with 2003 as it has just received two orders for the U.S. military and at press time, announced plans to have its debts repaid to the bank by the end of January 2003. The U.S. Army Tank-Automotive (TACOM) leased its premiere Theater Support vessel for the Army from Bollinger/INCAT USA, the Australian shipbuilder's joint aluminum shipbuilding venture in Louisiana.*

MR/EN: It's no secret that INCAT was



Robert Clifford, INCAT CEO, "The company is well-structured for the future."

in receivership last year — but is now emerging out of financial difficulty. What is the current status of the company and if you can please explain why hard times occurred last year?

Robert Clifford: INCAT had two customers lined up to take production ships in 1999, both customers elected instead to take near sisterships, offered by a financier. INCAT did not react soon enough to reduce production and this coupled with the banks lack of confidence in the market, led to the bank wishing to withdraw our finance facility. I point out here that Incat never exceeded the bank's facility.

By the end of Jan 2003 we expect to have the bank repaid, and orders in place.

MR/EN: What are the current activities (both corporate and manufacturing) that were undertaken by the organization to strengthen/restructure the company?

Clifford: With orders in place, no bank debt, and substantial unencumbered assets, INCAT will be well structured for the future.

MR/EN: Why will the "new" INCAT survive, when the old went into financial disclosure?

Clifford: There is no "new" INCAT, there never has been a question of INCAT's survival, it has only ever been a question of realizing some of its sub-

HMAS Jervis Bay at Sunset — INCAT's 282-ft. (86-m) wavepiercing catamaran.

stantial asset base, in order to repay the bank.

MR/EN: What sets you apart from your competitors?
Clifford: INCAT tries very hard to be very good at what we do best. We are experts at building high-speed catamarans, and have put 30 years of solid effort into all the design and manufacturing issues involved. We are not expert at Motor yacht Construction, nor do we pretend that we can build expertly anything that floats. Being specialist catamaran designers and builders we sell by proving our products in the field. We are the only builders in the world to have sold large fast catamarans for the use of military personnel. We have sold four.

MR/EN: Regarding the current fast craft market, what holds future promise — regionally speaking?
Clifford: The military market is exciting, but so too is the commercial market. We have 22 fast catamarans of earlier generations in European service, and many of the owners of those craft are ready to move up to higher capacity craft.

MR/EN: The push for more speed has always been the mainstay of the fast cats. Do you feel this is something that is played out and now the focus is on better performance, such as fuel efficiency, facility in the 40-knot range?
Clifford: The 40-knot range is probably enough for the commercial market, where the emphasis is definitely on economy.

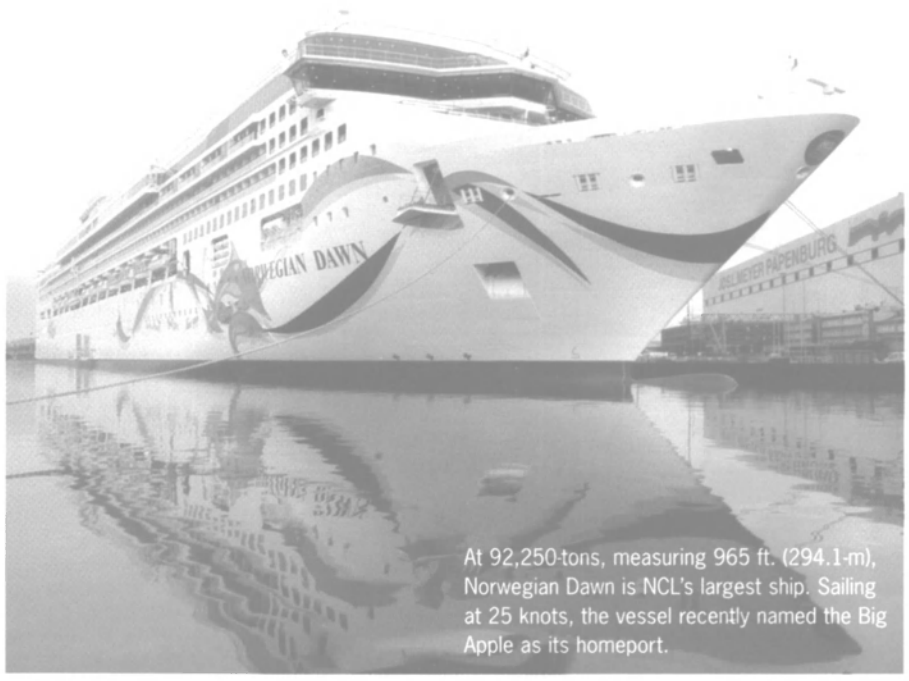
MR/EN: Please (briefly) recap some of the company's most recent events (i.e.: new deliveries, contracts with the U.S. military, etc.)
Clifford: Incat K3 has been sold to Guadeloupe, Hull 59 sold to Canada, Hull no. 60 sold to the USA for army use, and Hull no. 61 contracted for U.S. navy. Not bad for a company written off by many.

MR/EN: In your opinion, describe the allure of the "fast cats." Are they here to stay? Why or why not?
Clifford: There is no doubt about this, we have seen off the monohull challenge and trimarans etc. have even less to offer.

MR/EN: In terms of Bollinger/INCAT USA, what does the future hold for this venture?
Clifford: We will have to wait and see, but there is no doubt that it will be necessary to build the majority of U.S. military vessels in the U.S.

MR/EN: In your opinion, compare the need for fast ferries in the U.S. as opposed to Australia?
Clifford: There is little call for large fast ferries in Australia, and the Jones act means that vessels that trade within the U.S. must be built in the U.S. This restriction does not apply to ships that trade foreign to countries outside the U.S.
– Regina P. Ciardiello

NCL Debuts Newest Star with NYC Flair



At 92,250-tons, measuring 965 ft. (294.1-m), Norwegian Dawn is NCL's largest ship. Sailing at 25 knots, the vessel recently named the Big Apple as its homeport.

New York City rolled out the red carpet to welcome Norwegian Cruise Line's (NCL) latest addition to its fleet. In December, NCL debuted the 92,250-ton Norwegian Dawn, with NYC style reminiscent of the ship's new homeport. The christening ceremony aptly included a celebration amidst a few celebrities, a taste of Broadway and entertainment that truly characterize the Big Apple.

By Jennifer Rabulan, Assistant Editor

"Size does matter," said actress **Kim Cattrall,** who was chosen to serve as the Norwegian Dawn's godmother. The 'Sex and the City' star entertained the crowd at the christening ceremony during the official naming of the ship and pronounced the Norwegian Dawn the biggest ship in NYC.

The 92,250-ton Norwegian Dawn, which will call New York home year-round beginning in May, is the second cruise ship for NCL built at the Meyer Werft Shipyard in Germany. Norwegian Dawn is NCL's largest ship, accommodating 2,224 passengers and 1,112 crew, and was built at the maximum size to fit through the Panama Canal.

The Norwegian Dawn, dubbed the Star of the East Coast, is the sister-ship to Norwegian Star and the third ship purpose-built for NCL's popular Freestyle Cruising concept. The ship's vibrant colors and decor resonates throughout its interior and extends to the hull. The artwork featured on the hull depicting the Norwegian Dawn's expansive itinerary, runs on both sides of the ship, with the starboard side featuring dolphins playing in Technicolor waves reflecting the ship's Caribbean itinerary from the port of Miami. The port side features the Statue of Liberty, signifying the Bahamas and Florida itinerary from the Port of New York.

In addition to the new design, the Norwegian Dawn extends the industry's fervor to offer rooms with a view, as about 70 percent of cabins that are outside staterooms, with most of these having balconies.

Technically, the vessel is state-of-the-art, featuring diesel-electric podded propulsion and interactive communication devices.

Four diesel generators with a 14,700-kW output each are provided for power generation. The MAN B&W type 14V48/60 diesel engines can be operated both with diesel oil and heavy fuel oil. The generators (supplied by ABB) provide a voltage of 11,000V.

The ship is propelled via two 20,000 kW Azipods. Their 360 degree rotation - and the addition of three bow thrusters - provides the vessel with outstanding maneuverability. The propulsion system also ensures stable and quiet sea-keeping characteristics and an extremely low vibration level on board.

The ship also features a dynamic positioning system (DP system), designed to keeps the vessel in an exact position, and allows for the automatic berthing of the vessel. The Norwegian Dawn is equipped with an integrated bridge system type NACOS 65-4 supplied by STN Atlas Marine Electronics. The main components are two multi pilots which allow the radar screen, the electronic sea chart and all of the ships mission critical data to be displayed on one monitor. All bridge units are fitted with high-resolution color monitors, making it easier for the navigator to distinguish between the symbols.

Norwegian Dawn is divided into seven main fire zones and complies with the rules of a two-compartment vessel and is designed in accordance with the latest IMO regulations. The vessel is provided with six tenders and 14 lifeboats as well as two fast-rescue boats. In addition, six so-called "marine evacuation systems" have been installed. These rescue chutes allow very fast and safe evacuation in case of emergency.

Onboard of Norwegian Dawn up to 2,700,000 liters of potable water can be produced per day. The potable water is generated by three evaporators and a reverse osmosis system. Water consumption is reduced, for instance, by collecting condensed water from the air conditioning system and using it in the laundry. The hot water circuit is heated with steam. In addition, potable water can be taken onboard from bunker stations ashore.

The sewage water is collected in four vacuum systems through a piping system. It can be temporarily stored in tanks, if necessary. The sewage water produced is treated in four biological processing systems prior to being discharged.

All waste on board is separated (recyclable and non-recyclable; combustible and not combustible). The waste is either temporarily stored and later disposed of ashore or it is incinerated on board strictly observing the international emission regulations and disposed of later ashore. Sailing at 25 knots, Norwegian Dawn can operate seven-day roundtrip cruises to four ports in the Bahamas and Florida. Norwegian Cruise Line president and CEO **Colin Veitch** says the company decided to go year-round from Manhattan with its newest ship following the successful response to the vessel's December launch. NCL altered Norwegian Dawn's previously announced itinerary to call at Port Canaveral first, giving passengers a 15-hour day to visit Orlando-area theme parks and attractions. The ship then calls in Miami, Nassau and Great Stirrup Cay (NCL's private island in the Bahamas).

Size does matter, said actress **Kim Cattrall,** star of the popular show 'Sex and the City' and godmother of the 92,250-ton Norwegian Dawn. Upon its recent christening in New York, she wished the ship and its crew: "May you sail the seas with passion and delight."

(Photo: Jennifer Rabulan)

Norwegian Dawn captain **Idar Hoydal** poses with *MR* assistant editor **Jennifer Rabulan**.

Main Particulars
Norwegian Dawn

Gross tons	92,250
Length o.a.	965.6 ft.
Breadth, molded	105.6 ft.
Number of decks	15
Draft	9 (27 m)
Loading capacity	7,500 t
Engine power	58,800 kW (4 x 14,700 kW)
Propulsive power	39,000 kW (53,000 hp)
Speed	25 knots
Passengers capacity	2,224
Number of passenger cabins	1,112
Number of outside cabins (suites included)	759
Number of inside cabins	353
Officers and crew	1,130
Theatre capacity	1,037
Number of restaurants	10
Number of bars/lounges	14
Total weight of paint applied	abt. 220 t
Total length of cables laid	2,000 km
Total length of pipes laid	200 km
Flag	Bahamas
Classification	DNV

Damen Delivers High Level of Tug Tech

Damen is well-renowned for its innovative tug design, construction and outfitting prowess, a reputation upheld on a pair of vessels, the recently delivered Levanto Secondo and the currently under construction Damen Azimuth Stern Drive Tug 2411 yard number 512201.

Levanto Secondo

Levanto Secondo is a Damen Azimuth Stern Drive Tug 2810 delivered in October 2002, to SCAFI, an Italian operator. The design of the Azimuth Stern Drive 2810 has been completely prepared to comply with U.S. tonnage rules and USCG-requirements, so that it can be of interest and use to the U.S. market as well. Levanto Secondo is the second vessel of this type, ordered by SCAFI, and it will be used in the harbor of La Spezia in the northern part of Italy.

The ASD Tug 2810 has a round bilge hull with a transom stern and a rounded bow. The transom corners are well rounded and the forecastle gives sufficient bow height for severe working conditions. The hull is divided into five compartments and features 10 mm side and bottom plating, and 8mm deck plating. Bottom plating in the thruster area is increased to 12 mm, and the sheerstrake has a plate thickness of 15 mm.

Damen ASD Tug 2810 — Levanto Secondo — was recently delivered.

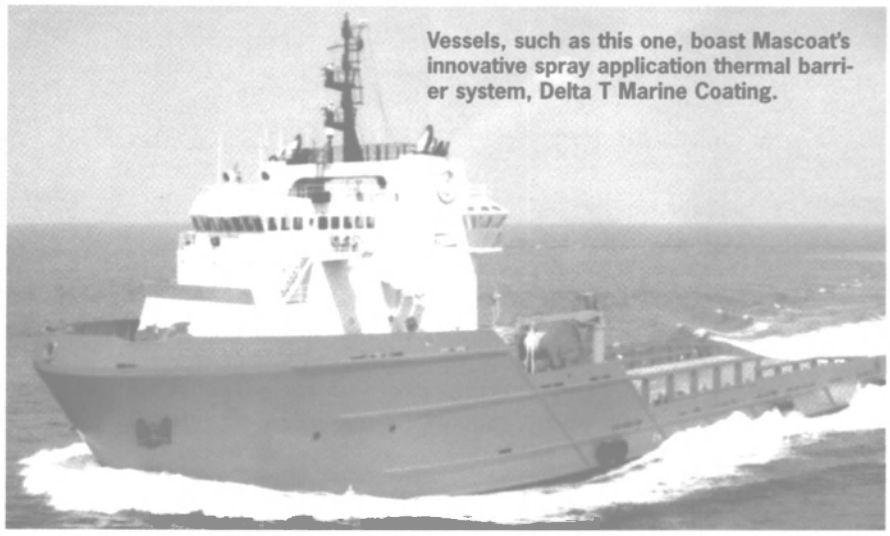
Damen ASD Tug 2411 is currently under construction.

The large superstructure has ample space for a separate galley and mess room and for the cabins for the captain and the chief engineer. Below deck three cabins are arranged, two single officer's cabins and one three crew cabin. All below deck cabins are arranged above the waterline. The wheelhouse has a control stand, with an excellent optimal view in all directions.

A pair of nine-cylinder Wartsila 9L20 engines (1,620 kW (2,172 bhp) at 1,000 rpm each) power Levanto Secondo, driving Schottel SRP 1212 thrusters, with controllable pitch propellers. The vessel is designed to comply flexibly to a specific owners need, as it is able to accommodate a number of different engines and thrusters from different manufacturers.

On the fore deck and on the aft deck Kraaijeveld towing winches are fitted. The brake holding power of both winches is 130 tons, and both winches have stainless steel rims with band brakes and friction clutches. The fore winch is of the single drum type, suitable for 150 m synthetic rope of 80 mm diameter. The

A Proven, New Approach for Vessel Insulation



Vessels, such as this one, boast Mascoat's innovative spray application thermal barrier system, Delta T Marine Coating.

Vessel insulation has changed very little in many years. Normally hidden from direct view, thermal insulation systems can become ineffective over time due to poor installation, vibration or moisture intrusion. In fact, if moisture is ever introduced into the insulation from a leak, poor installation, or inadequate repair job, the conventional insulation methods are worse than if insulation had not been used at all.

Common Methods of Thermal Insulation Inside Vessels

In the past, most shipyards and owners have been at the mercy of technology that only incorporates one aspect of heat/cold transfer known as conduction. These insulation systems have been designed to retard heat and cold over time and treat & solve heat transfer as a symptom, not as the inherit problem. Common pin-and-blanket insulation found on most vessels requires the painstaking task of bringing the insulation material into an area, placement of attachment pins, cutting, tapping and finally fitting of the insulation. With this multi-step process, which is quite labor intensive, only around ten square feet (one square meter) of insulation can be installed in a one-man hour time period. If not managed well, this process could lead to dramatic man-hour cost overruns. In addition, over time these blanket insulation systems lose their power to retard heat/cold and therefore are a direct gate for thermal transfer into the vessel.

Another common way of insulating vessels is to use foam-in-place insulation systems. This system requires special equipment, highly trained personnel and usually complete shut down of other ongoing tasks of a job during an application due to safety and PPE (personnel protection equipment) concerns. Since foam systems work on chemical reactions of component products that are highly flammable, these systems do not pass the current FTP codes and can in fact contribute to the dangers and damage caused by fire. Just recently, there have been two incidents of fires onboard crew vessels where foam insulation contributed to death.

Other problems of these foam systems include, outsourcing of personnel for an application, bonding and detachment issues, degradation of the insulation due to vibration, and most importantly corrosion under insulation. Though this is a cheaper method of insulating, foam systems have been highly scrutinized as an antiquated technology.

A New Approach to Thermal Insulation and Protection of Vessels

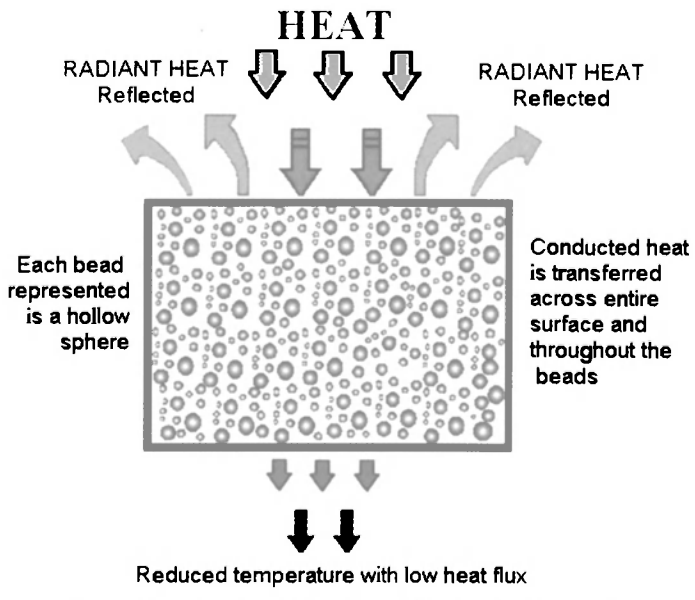
In 1995, Mascoat Products, Houston, Texas, developed a new spray application thermal barrier system, Delta T Marine Insulating Coating, which has been successfully used worldwide on more than 200 vessels. The system is a water-based acrylic binder that encapsulates air-filled ceramic insulating particles to help reduce or eliminate most radiant heat/cold transmission. Delta T Marine is sprayed on the inside shell of most modern vessels at a thickness of 20-60 mils (0.5-1.5mm). By direct bonding, a substrate becomes thoroughly protected and eliminates the potential of development for Corrosion Under Insulation. Vessels employing the coating system are now insulated and protected with a thermal transfer rating of RvE 9-13 factor when compared with conventional insulation. Thus, this spray system used alone or in conjunction with conventional wallboard provides equal or better protection of thermal transfer at a reduced cost and time effort.

Most shipyards that have used the Delta T Marine find that application is quick to learn as well as easy to apply. Normally sprayed with an airless sprayer, Delta T applies much like thick consistency paint. With little training, the existing paint crew of a shipyard can be taught to spray the coating efficiently. This allows shipyards to control insulation with existing paint crews thereby reducing the outsourcing need in most circumstances. Crews can average 1000 sq. feet (100 sq. m.)/hr. This equates to a substantial man-hour savings and a fantastic way to trim or maintain man-hour costs.

Although the material price is somewhat higher for Delta T Marine, total installation costs after labor are dramatically reduced. Additional benefits include escalation in the time frame of the vessel and ease of repair if change orders require additional fabrication. Most yards see up to 50-80 percent time frame escalation and 30-45 percent reduction on total installed costs.

How can a coating replace 3-in. of conventional insulation? This is a common question that arises. According to George More, president of Mascoat Products, "Insulation has changed very little for many years. Most thermal blanket and foam insulation systems use only the principle of conduction as a sole blocking agent of heat transfer. This means using only one of five methods that reduce thermal transfer. Our system uses all basic principles of thermal dynamics to our advantage. Our coating deals with heat or cold before it enters or penetrates typical vessel insulation. This allows our system to work more efficiently and keep thickness to a minimum. More importantly, our system will not degrade due to vibration or moisture intrusion and is not flammable like foam systems are."

Basically the coating works because Delta T Coating employs its highly reflective white surface and ceramic composition structure to reflect heat away from the substrate and back to the atmosphere. Imagine a Thermos® bottle. The coating is very similar in this respect. The coating actually reflects upward of 85 percent of the heat /cold generated back to the respective substrate or atmosphere.



Cross Section of heat and Delta T Coating

Delta T Coatings

www.deltacoat.com

Its hollow, microscopic glass and silica air-filled beads provide an excellent "k "or conductivity factor by dissipating the heat over the entire surface hindering the conductive process. This means there is no hotspot or vertical heat pipe effect like conventional insulation. (The vertical heat pipe effect is the way in which conventional insulation passes heat via free air convection through the insulation vertically. This heat is then transferred to the overhead deck area. Temperature increases can be as much as 5°C or around 25°F.)

Also Delta T Coatings' unusually low emittance allows little heat to be re-radiated into the atmosphere starting a convective process. The coating also employs other heat blocking agents of absorptance and transmittance, increasing its insulating factor. By adding up the conduction, reflection, emmisivity, transmittance and absorptance properties of Delta T Marine coating, all aspects of thermal transfer can be employed in one product.

Another beneficial aspect of the product includes its sound deadening characteristics and weight savings. Delta T Marine applied inside a vessels shell drops air borne structural noise 50-80 percent depending on thicknesses and substrate. Its lightweight composite bead structure equates to 0.07 lbs. / sq. ft. applied as opposed to 0.5lb-1.5lbs sq. ft. for conventional systems. This is very important in yacht and ferry construction where sound and weight materials are highly scrutinized.

New Series of Products

Just recently, Mascoat Products has introduced its second-generation series of products. This new series employs advanced chemistry techniques to make the coating more paint-like as well as expanding the coating's insulation abilities. This allows for increased square footage per gallon and an increase in thermal efficiency.

Classifications

Delta T Marine has passed rigorous testing and is classified in accordance with IMO/SOLAS guidelines. This product is certified by U.S.C.G., A.B.S., D.N.V., and Lloyd's (MCA) to the new FTP Codes. The product is packaged in one (4 liters), five (18.9 liters), and fifty-five gallon containers and is sold factory direct to the shipyard or owner or through various distributors.

For further information, contact: Sales Department, Mascoat Products, 10890 Alcott Drive, Building # 102, Houston, Texas 77043, tel:(713)465-0304, or log on to www.deltacoat.com.

Circle 199 on Reader Service Card

pull of the fore winch is 10 tons at 20 m/min., or 20 tons at 10 m/min. The aft winch can store 200 m synthetic rope of 80 mm diameter and has a pull and speed of 10 tons at 20 m/min or 20 tons at 10 m/min. The ropes used on the fore and aft winch run through stainless steel triangular fairleads integrated in the towing bitt.

On the aft deck a Kraaijeveld capstan of 3.5 ton pull is arranged, and a Mampaey towing hook of 65 ton Safe Working Load is fitted.

Azimuth Stern Drive Tug 2411

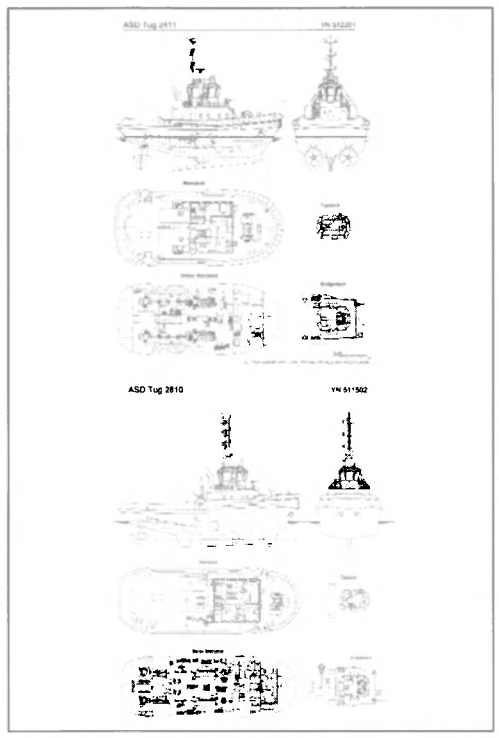
The Damen Azimuth Stern Drive Tug 2411 (yard number 512201) is currently being built in China and is expected to be ready for delivery in October 2003. The ASD 2411 is the newest product of the Damen ASD series and is a typical harbor tug with designed to provide excellent maneuverability and impressive bollard pull. The vessel's hull shape and appendages were finalized after a successful series of model tests at the MARIN test basin facilities in The Netherlands. It, too, complies with the stability criteria of U.S. Coast Guard. The classification society for this vessel is Lloyd's Register of Shipping.

Two sixteen-cylinder Caterpillar 3516B TA HD engines power the ASD 2411. The output of each main engine is 4,170 kW (5,592 bhp) at 1,600 rpm. These engines drive the Aquamaster US 255 thrusters, with fixed pitch propellers. Between the main engines and the thrusters, slipping clutches are fitted, make Twin Disc, type MCD-LD. By means of these slipping clutches, the propeller speed can be controlled very accurately when main engines run at idle rpm. The thrusters have a propeller diameter of 2600 mm. The nozzles are with stainless steel inner ring.

The ASD 2411 is fitted with two Caterpillar auxiliary engines, driving 106 kVA Caterpillar SR4 generators. The ASD Tug 2411 is equipped with a SIHI fire-fighting pump of 600 m3/hr at 10 bar, driven by a Caterpillar 3306B engine.

In front of the deckhouse a manually controlled Ajax fire-fighting monitor is fitted, with a capacity of 600 cu. m./hr. A venturi type foam-mixer is installed at the pump, up to a maximum of six-percent. Furthermore, an electrically submersible driven salvage pump is delivered.

Circle 30 on Reader Service Card



Circle 287 on Reader Service Card

Circle 252 on Reader Service Card

(Drawing courtesy of Peter K. Hsu)

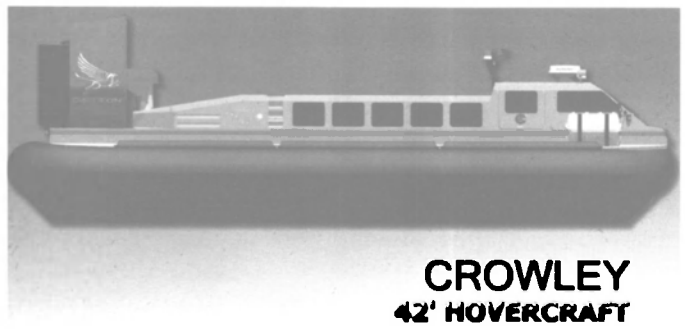
Chung Hoon Christened at Northrop Grumman

The namesake Chung-Hoon will honor Rear Admiral **Gordon Paiea Chung-Hoon,** for the 43rd ship of the Arleigh Burke class guided missile Aegis destroyer. The 509-ft., 9,300-ton CHUNG-HOON (DDG 93) was christened at Pascagoula Miss. on January 11, 2003. Admiral Chung-Hoon, a native of Honolulu, Hawaii, was born July 10, 1910. Chung-Hoon attended the U.S. Naval Academy and graduated in May 1934. Admiral Chung-Hoon, then Commander, was the captain of a Flecther class destroyer , the USS Sigsbee DD 502. On April 14, 1945, the Sigsbee was on station for Radar Picket duty off Okinawa when she was hit in the stern by a Kamikaze, reducing her starboard engine to five knots and knocking out the ship's port engine and steering control. Desipte the damage, Commander Chung-Hoon valiantly kept the antiaircraft batteries delivering "prolonged and effective fire" against the continuing enemy air attack while simultaneously directing damage control efforts which saved the ship.

Abeking & Rasmussen Wins Pilot Tender Order

The Federal Ministry of Transport has decided to order a fourth SWATH Pilot Vessel from Abeking & Rasmussen following successful operation of the first three SWATH@A&R vessels for pilot service in the German Bight and the Elbe Approach. Since commissioning of the Elbe Range Pilot System in 1999/2000, shipborne pilot transfer increased significantly. The efficiency of the "Elbe Range" system resulted in cost savings of several million dollars each year, making the decision much easier for the new 82-ft. (25-m) SWATH@A&R Pilot Tender which will be delivered in Autumn 2004 and will extend the Elbe Range System up to the outer Weser Approach.

Circle 10 on Reader Service Card



Crowley Orders Hovercraft from Kvichak

Griffon Hovercraft Ltd. of Southampton, U.K. has licensed Kvichak Marine Industries of Seattle, Wash. to manufacture its range of diesel engine-powered amphibious hovercraft. Through its licensing agreement with Kvichak Marine and its exclusive sales agent in the U.S., Griffon Hovercraft-USA, Griffon Hovercraft Ltd. is able to improve access to the U.S. market for domestic build requirement projects, and Kvichak Marine in turn gains access to the largest range of hovercraft available in the world to manufacture - possibly in the world's largest market. The first order for a Kvichak-built Griffon hovercraft has already been confirmed and building has commenced. Crowley Marine Services has placed an order for a 20-seat Griffon 2000TD to be operated on the North Slope of Alaska for British Petroleum (BP).

Circle 11 on Reader Service Card

Main Particulars - Griffon Hovercraft 2000TD

Length	39 ft. (11.9 m)
Beam	15 ft. (4.7 m)
Hovering height	(0.73 m)
Maximum payload	2,000 kg
Passengers	18-25
Crew	2
Engine	Deutz BF8L513LC hp 355
Speed	35 knots

EU Encourages Wartsila MAN B&W, Teaming

Aiming at the development of Ultra Low Emissions Marine Engines, MAN B&W Diesel Group and Wartsila Corporation have been encouraged to participate as principal forces in a large scale R&D integrated project under the auspices of the European Union (EU) to address the global problem of CO2 and pollutant emissions. The project will be proposed to be partly funded within the EU Framework Program 6 and is expected to start in 2004. The two companies lead a select consortium with a large number of participating organizations (manufacturers, suppliers, operators, scientific institutions) in the cutting edge of industrial R&D. The project setup ensures that the commercial competition between the two groups of companies, including their respective licensees, remains unaffected. The project co-coordinator is professor N. Kyrtatos of NTU Athens.

LR, Resurgence Software Team Up

Lloyd's Register (LR) and Resurgence Software have formed of an important software marketing alliance which gives Lloyd's Register rights to jointly market Resurgence Software's industry leading equipment reliability analysis software system Wave. Wave, which is a ship equipment reliability analysis software tool that helps ship owners and operators better manage their fleets. It aims to increase revenue through optimization of reliability-related maintenance practice and reliability-related downtime losses.Its powerful reporting functionality provides users with critical equipment reliability information to make better decisions when setting maintenance policies and practices, and making repair vs. replace and equipment procurement decisions.

Circle 8 on Reader Service Card

Noble Promoted to President at Midland

Ingram Industries Inc. announced the promotion of **W. Scott Noble** to President and COO of its Midland Enterprises Inc. subsidiary. Midland is a Cincinnati-based inland marine transportation business that became part of Ingram Industries Inc. last July. Noble was also named President and COO of The Ohio River Company and Orgulf Transport Co. He will be based in Cincinnati, Ohio.

The New Face of Security

(Continued from page 8)

port facilities for the first time. Historically, they have been treated by the international community as vessels. The USCG's treatment of them is quite ambiguous. Sometimes they treat these oil patch units as vessels, sometimes as facilities.

• Vulnerability Assessments and Security Plans: The new amendments require port facilities and ships to perform vulnerability analyses and develop security plans. This is extremely far-reaching, and would impose international standards on facilities throughout the US (including all inland port facilities along USCG-superintended waterways), as well as each and every vessel and port. This will require the expenditure of a lot of financial resources.

• Container Security: All major container facilities worldwide will be linked and utilize a risk based container monitoring system currently in use by the U.S. Customs Service. The elements of this system include:

• Establishing security criteria to identify high-risk containers

• Use technology to pre-screen high-risk containers before arrival at U.S. ports

• Develop and utilize smart and secure containers.

This all sounds great - but how will it work? How much can we depend on foreign interests? Will this require stationing U.S. Customs Inspectors overseas? Who will pay for this?

• Seafarer Identification: Positive and verifiable identification for all seafarers. Positive meaning that the document holder is the person to whom the document was issued, and verifiable meaning the validation of the authenticity of the document by an acceptable source. The identification will contain: a digital photo, holder's signature, issuing authority, proof of nationality, positive identification of mariner's qualification, permission to enter other countries, and biometric template (digital fingerprint). It seems probable that this will become deeply embroiled in international politics and will not be completed for many years.

• Means of Ship alerting: An alarm will be installed on each vessel similar to the EPIRB that will transmit via satellite communications if the vessel is a victim of piracy/armed attack. This will utilize existing technology where possible and add equipment where necessary.

The Coast Guard published a Notice in the Federal Register on December 30, 2002 discussing public meetings held around the country, starting at the end of January, concerning security.

The Notice asks for input on 40 specific questions concerning possible directions for the national maritime security efforts to take. Reviewing the Federal Register leads one to conclude unquestionably that our maritime world is going to go through a fairly dramatic change in the coming months and years.

The US has been an extremely successful open society, with only limited restrictions placed upon individual freedoms. The threat of terrorism, coupled with the confrontations with Iraq, Iran, and North Korea, is changing this openness.

The last set of national changes in maritime direction were the result of the catastrophic grounding of the Exxon Valdez in the spring of 1989, which led to the passage of the Oil Pollution Act of 1990 (OPA '90). At that time, the USCG implemented many of the important, initial requirements of OPA '90 via Navigation and Vessel Inspection Circulars (NVICs), and the regulations came later. Time was pushing action. Reaction from the IMO came much later.

This time, the governmental shift in direction toward national security is happening differently. For virtually the all of calendar 2002, Congress was at a standstill, with no maritime security legislation of any consequence being passed. All the while, the USCG was working with the IMO to develop international standards. This was time well spent, as the Coast Guard was spearheading efforts to develop (at an expedited pace) international security measures through IMO, rather than go first through Congress, and then through IMO. In the past, many knowledgeable in the workings of government had accused the USCG of engineering requirements through the IMO that the maritime public would find onerous, and which Congress would not pass on their own (before it even reaches the President to be signed into law).

There is no question that the USCG prodded, coaxed, and cajoled IMO into action with regard to the current security issues as was done with OPA '90. It is not clear if the USCG's actions will create any economic impact on competition, or if it will simply be something that all in the trade will adjust to and go about its business. One might well question the ability of small operators, both of vessels and facilities, to make the shift to these enhanced security requirements without suffering severe economic consequences.

There is also an acute subjective element in the domestic application that would appear to allow different (or even the same) USCG Captains of the Port to enforce different standards at the same type of facility in different locations. Application of this type of variable judgmental standard has not been the Coast Guard's forte in the past, and could lead to serious problems.

The USCG has led off recent security initiatives with the use of voluntary or recommended standards published as NVICs. The enabling statute, the Marine Transportation Security Act of 2002 (MTSA '02) waives the Administrative Procedures Act, which controls the regulatory promulgation process. We will see regulations concerning security plans by Q2 2003. It is also possible that the USCG will fall back on the use of mandatory NVICs if the regulatory process stalls.

All of these issues passed the IMO General Session, and will be requirements for international trade by July 2004. The biggest concern of all this is the overall effect of all of these security measures on commerce. How many vessel operators and facility operators will simply disappear because their physical plant cannot conform to the new standards or because they cannot afford to absorb the cost of the new security measures? How will they be applied fairly on a nationwide basis without economic harm to some and advantage to others? Uneven application of the standards seems to be encouraged for good and just reasons. With the FOIA disappearing for Security Sensitive Information (SSI), how will anyone ever find out if the economic advantage is granted to an operator, or denied another?

Will all of these measures directly eliminate the potential for maritime sabotage without dramatic impact upon our maritime infrastructure? Tough question - potentially scary answer.

Charley Havnen is a Commander USCG Ret. His organization can help you with your vessel construction project, regulatory problems, vessel manning issues, procedure manuals, accident analysis or serve as an expert witness. His organization can do what you can't or don't want to do, and are online at www.havnengroup.com. He can also be reached by contacting the Havnen Group in New Orleans: (800) 493-3883 or (504) 394-8933, fax: (504) 394-8869.

Canada To Spend $113.2M on Security

Canada will spend up to $113.2 in the next five years on technology and training in order to bolster security initiatives at Canadian ports and improve surveillance at sea. The Government of Canada also unveiled new gamma ray technology that will be installed at strategic locations to enhance marine security across the country.

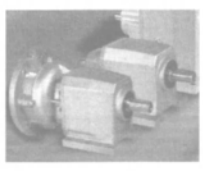
New Console for Transas GMDSS Simulator

Transas has redesigned the TGS-4000 GMDSS Console intended for operation with its TGS-4100 GMDSS simulator

software. The modern look of the new hardware solution and its compact dimensions, which are now 475 x 255 x 78 mm (W x H x D), differentiate it from the previous console model. The new TGS-4000 Console comprises S.P.Radio control panels, including VHF with DSC Sailor RT4822, MF/HF with DSC Sailor HC4500, INMARSAT-C SES Sailor H2095B, and Battery Panel Sailor BP4680. The delivery set includes a separate Sailor Alarm Panel AP4365 connected to the Console via specially supplied cable.

Circle 27 on Reader Service Card

Viking Pump Offers New In-line Gear Reducers



Viking Pump expanded its gear reducer product line to include a new series of in-line gear reducers compatible with any positive displacement pump or other equipment needing speed reduction. The new gear reducers have the input and output shaft on the same centerline for easy alignment and maximum space savings. All gear reducers in the new series offer double reduction, high efficiency and low noise levels.

Circle 1 on Reader Service Card

Trailer Bridge Awarded Patent

Trailer Bridge, Inc. said that the U.S. Patent and Trademark Office (USPTO) has awarded a patent related to the method of loading vehicles in and unloading vehicles from Trailer Bridge's previously patented Vehicle Transportation Module (VTM) container. Trailer Bridge was informed by the USPTO that Patent No. 6,503,034 was issued on January 7, 2003. Previously, Patent No. 6,416,264 was awarded on July 9, 2002 to Trailer Bridge as assignee for the invention of the Vehicle Transportation Module (VTM) container.

The Dilemma: Competent Crews vs. Costs

The V.Ships Managing Director of USA Shipmanagement operations — **Mike Robinson,** says that owners are anxious to secure competent crews to serve on their vessels in the coming years, but cost remains an overriding theme in today's market.

V.Ships is aware that the global shortage of seafarers is causing concern.

"The increasingly strict regulatory environment, including the impact of the International Safety Management Code phase 2 provision for all vessels, together with STCW95, means that experienced and fully trained officers and ratings are more crucial than ever to the process of compliance if problems are to be avoided," says Robinson.

Providing management for more than 600 ships, more than half of which are under full technical management, makes V.Ships the largest employer of seagoing staff in the world, with a pool of some 22,500 seafarers of whom some 12,000 are at sea at any one time. An additional 300 cadets make up the complement.

V.Ships draws its seafarers from a wide variety of nationalities, with the largest number coming from the Philippines, India, Ukraine, Russia and the Baltic States. Other countries provide a growing roster of seafarers to the pool.

"Maintaining this crew supply commitment means employing an active recruitment policy to take advantage of all the appropriate sources of seafarers world wide." says Robinson. "Owners come to us because they know we have this huge resource of diverse talent and experience to tap into, enabling us to provide exactly the type of crew they require".

V.Ships provides crew to owners on a variety of terms to suit their needs. These can be lump sum agreements, cost plus agreements or contract crewing arrangements where full crews or a number of officers or specialists are required for a specific period or contract.

Through progressive career development programmes and a real focus on training, V.Ships is able to achieve an 87 percent crew retention success rate.

"This is very significant for clients," says the V.Ships MD, "as crews can be retained within their fleets on a continuous basis generating loyalty and operational efficiencies. When we put a crew on a vessel we don't just forget them. Crew performance is monitored continuously through appraisal reports with correct recognition of performance through promotion or proper assessment of needs or shortcomings through training".

Turning to the question of costs, Robinson believes that owners in all parts of the world — whether it is in Asia Pacific or the Caribbean trades — are looking at the outsourcing option, in a constant drive towards cost efficiency. This does not mean cutting back on crucial areas like safety and high quality manning, but in achieving efficiencies in areas such as procurement of essential supplies — spare parts, bunker fuel, paint, drydocking and ship stores.

V.Ships is also a founder member of MARCAS, the Marine Contracting Association, which itself negotiates terms worldwide for more than 500 vessels. Companies like World-Wide Shipping, Teekay, International United Shipping and BP Shipping are members of this buying association.

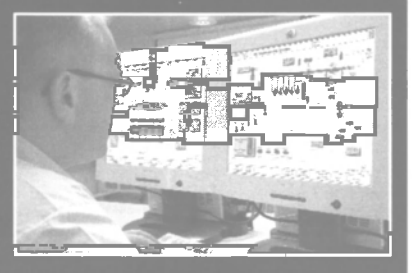
Robinson stresses that underpinning all the Company's shipmanagement procedures is the V.Ships Safety Management System (VMS), which has been developed over many years experience in the safe management of ships with a focus on risk management. "It is a dynamic system," says Robinson "which is being continually improved for the purposes of ensuring safer ships and a safer environment, whilst meeting the needs of clients in operating their vessels. It complies with ISM and ISO 9001:2000 as well as SEP and DNV's ISO 14001 quality standards, for customers who wish to gain these additional accreditations."

Robinson explains that the VMS exceeds the necessary obligations required by international, flag state, class and industry regulations by offering substantial guidance to V.Ships staff at sea and ashore on how to operate the vessels under management in the safest possible way with the minimum of risk to persons, the environment and property.

For owners concerned about losing control of their vessels, if they give them to a third party ship manager, Mike Robinson believes that just the reverse is the case. The V.Ships "ShipSure" integrated ship to shore

(Continued on page 56)

MEBA School Awards Contract For Engine Room Simulator

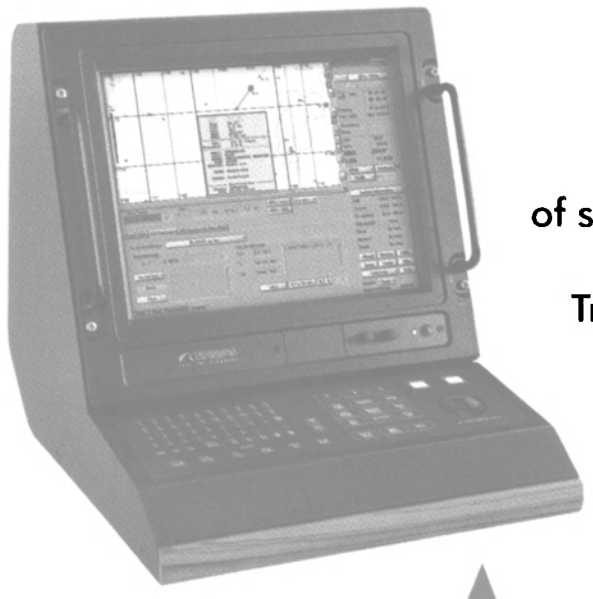


Calhoon MEBA Engineering School has awarded a contract for the delivery of a new PC-based Windows Engine Room Simulator to Kongsberg Maritime Ship Systems (KMSS), one of the leading suppliers of ship automation and control systems as well as ship simulators.

The system includes two diesel propulsion plant models: M22 Pielstick10PC4 Medium Speed Diesel and MAN B&W 5L90MC Slow Speed Diesel. The workstation-based system uses the same Instructor Station and Engine Model software as the full-mission engine room configuration. KMSS engine room simulators are based on actual ships and propulsion systems; and feature the largest selection of engine models in the world, including slow and medium speed diesels, steam, gas turbine, diesel-electric, and other combined propulsion plants. The M22 Pielstick and the MAN B&W 5L90 are two of the most sophisticated models in the KMSS Library of Engine Models. The M22 Pielstick simulates the engineering plant of the USNS TAO-187 Class of Oilers. The MAN B&W 5L90 is the latest model of a large tanker propulsion plant and includes numerous enhancements to the main engine, auxiliary systems and the electrical power plant. Both models are designed to meet the training requirements of DNV and STCW '95. The system features the latest KMSS Enhanced Instructor Station software with dual flat screen displays. Connecting two screens to the computer makes the desktop twice as large, and provides for "dragging" and "dropping" between screens for the operational freedom to create the preferred "views." New communications tools in the Instructor Station provide a "virtual learning environment" whereby the Instructor can organize the virtual classroom in a number of different ways including an icon grouping of the virtual classroom, a listing of student details, a grouping of students in a directory structure, or a mosaic view with thumbnails of student screens. The Instructor can change quickly between views, and the student screens can be sequentially displayed in selected intervals at the Instructor Station.

Circle 44 on Reader Service Card

MEETING THE IMO
UAIS TRANSPONDER
CARRIAGE REQUIREMENTS



Transas proudly
announces
the beginning
of serial production of its
MT-1 UAIS
Transponder system.

Navi-Sailor 3000 ECDIS

THE WINNING COMBINATION

MT-1 UAIS Transponder

Interfacing MT-1 UAIS Transponder with Navi-Sailor 3000 ECDIS provides the follwing additional benefits:

- Integration of all navigational and vessel traffic information on the electronic chart screen
- Accurate and reliable target ships tracking information
- Graphical representation of UAIS target ships data on the electronic chart
- Efficient collision avoidance tool
- Automatic incorporation of UAIS Transponder data into ECDIS calculations
- Advanced operations with target ship database
- Short Message Service

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IT SOLUTIONS AT SEA AND ASHORE

Circle 264 on Reader Service Card

(Continued from page 54)

management system — due for rollout in the USA later this year — which controls all management and operating processes linking ship to shore, will be available right in the owners office giving them full access to all the information relevant to their ships and greater control over the management process. **Mike Robinson** says that in the current market there is much to discuss with owners — particularly the cost benefits that a ship manager the size of V.Ships can and does provide combined with the very personalised management service provided by each of the regional offices.

Circle 12 on Reader Service Card

Maritime-eCampus to Canadian CG College

KMSS has been awarded a contract to deliver E-learning software and services to the Canadian Coast Guard College (CCGC) - a first for the recently released KMSS software. KMSS will be hosting the CCGC courses on its maritime.e-campus.com education portal.

KMSS has pioneered the deployment of both navigation and engine room simulators over the Internet. "We know that on-line deployment of Maritime training requires an interactive exercise component. Internet capable simulation has been the missing link." said **Henry Tremblay** of KMSS Canada.

Circle 15 on Reader Service Card

PMI Selects Transas For Navigational Simulation

Pacific Maritime Institute (PMI) has chosen Transas Marine USA to provide the Navigational Simulation systems for its new simulation and training facility to be located in the heart of the Port of Seattle, opening in the summer of 2003.

The 15,000-sq. ft. facility will include a new full mission ship simulator to DNV Class A standards with dual instructor stations, as well as five secondary bridges for operating interactive exercises. Boasting a combination of the latest visual technologies, model databases, and a uniquely flexible design, the bridge simulator will provide a highly realistic training environment both inside and outside the wheelhouse.

PMI's simulator facility will be used to offer expanded courses to a wide range of maritime professions, including ships and towing officers, tankermen, pilots, the fishing industry, port security officers, vessel traffic control personnel, and many others. The contract marks a further milestone in the close relationship between PMI and Transas Marine USA that aims to provide for the best possible training, research and technology services to the maritime industry in the region. The continued success of PMI's ECDIS training program that was a first of its kind in the USA, that utilizes Transas Marine's Navi Sailor software, is an example of this, and further demonstrates the synergy between our two organizations. This program has now been enhanced to meet demand for AIS training with ECDIS.

Circle 20 on Reader Service Card

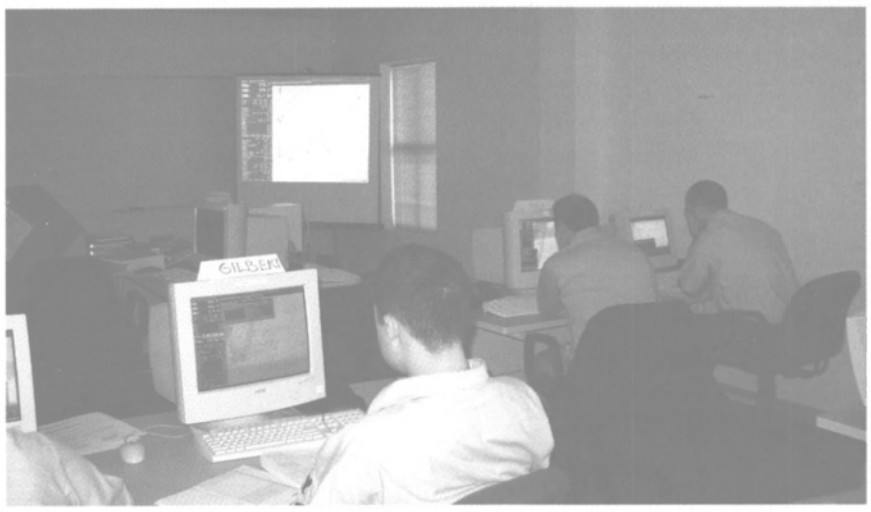
Blue Ridge Officers Complete Safety Training

The U.S. Navy's Seventh Fleet command ship, USS Blue Ridge (LCC-19), is outfitted with the latest command, control, and communications technology in order to effectively command naval units defending the national interests of the United States.

This highly visible ship, which operates routinely in the Western Pacific and Indian Ocean, and waters adjacent to areas involved in the War on Terrorism, visits many foreign ports, conducting military and diplomatic engagements with U.S. allies, in her normal international duties. With the potential threat to this valuable national asset, and the need for continuous review and practice of force protection, Blue Ridge's Commanding Officer, Capt. **Andrew Sevald** sent 10 of his officers to Naval Station San Diego, Calif. recently to take advantage of the Marine Safety International (MSI) training facility. The simulator training available at MSI features ship handling, safe navigation and many other areas, including force protection.

LCDR David W. Haas, Blue Ridge's Executive Officer, who oversaw the training at the facility, said that naval surface warfare officers use the facility to develop basic surface warfare skills, but the Blue Ridge officers were able to further expand the numerous scenarios the trainer offers.

"Every six months, the Captain (Sevald) or I go with 10 junior officers to the trainer to maintain skills," he said. "After an SRA [Ship's Restricted Availability] period, this can help to recapture the mariner's eye. But after the USS COLE (DDG 67) incident," said Haas, "I asked if it would be possible if we could interact a terrorist type scenario into the training."



Show Preview

Shipping 2003: Don't Stop Thinking About Tomorrow

Bringing together a diverse group of individuals within the maritime industry, the Connecticut Maritime Association (CMA), plans to host its annual Trade Show and Conference from March 17-19, 2003 at the Westin Stamford Hotel in Stamford, Conn. Touting a "fragile freight market, a contentious geo-political environment, commodity deflation and criminal environmental prosecutions," as some of the reasons for the current demanding state of the shipbuilding marketplace, CMA plans to produce its largest ever exhibition, which will focus on a discussion of ideas and issues, that will aim to tackle some of the most critical and pertinent issues in today's shipbuilding industry.

With delegates, sponsors and exhibitors attending the conference from more than 50 countries, the exhibition reinforces its existence as the conference "that brings the decision makers together" and the exhibition where "business gets done."

A customized conference program, coupled with diverse global exhibits showcasing a variety of services, equipment and innovations, will provide attendees the opportunity to build myriad of contacts while focusing on the future of this ever-changing industry.

Some of the most distinguished and respected individuals in the maritime industry will be presenting their views on a variety of topics. The CMA will also be presenting its annual Commodore Award at the Gala Dinner, which will be held on the exhibition's final night of Wednesday, March 19. The Award, which is distributed to an "individual who has significantly contributed to the dynamism, growth and development of the maritime industry," will be distributed to **Stelios Haji-Ioannou**, chairman easyGroup, hailed for his revolutionary efforts on impacting the transportation industry.

ACR

ACR manufactures a full range of Emergency Position Indicating Radio Beacons (EPIRBs), emergency VHF radios, man overboard lights, emergency life jacket lights, search lights, strobe lights and search and rescue transponders (SART). ACR manufactures the world's smallest, fastest EPIRBs and continues to bring lifesaving equipment to the marine market.

Circle No. 101

C-Map

C-Map produces vector-based electronic charts and charting systems. Simply stated, electronic charts are digitized versions of their paper nautical counterparts. When integrated with a vessel's positioning sensor, an electronic charting system shows the mariner where he is, where he's been and where he's going.

Circle No. 102

Deansteel

I.M.O. - FTP Code Marine fire doors and frames certified by U.S.C.G. and Lloyds. Interior and exterior applications; louvers, lites, and a wide range of hardware. Deansteel specializes in standard and custom berths available with drawers and curtains. Complete galley design, fabrication, and installation. American made and owned with continuous after-sales service.

Circle No. 103

Deltamarin

Deltamarin specializes in marine consulting, design and engineering. The company operates worldwide and covers the complete field of engineering from feasibility studies up to an engineering package of a complete vessel. Project management, master planning, build procedures, procurement, coordination and supervision are also included in Deltamarin's services.

Circle No. 104

Fibergrate

Fibergrate Composite Structures Inc., manufacturer of the Chemgrate and Fibergrate brands, is the inventor and world's leader in molded fiberglass reinforced plastic (FRP) grating. With 35 years of experience in the FRP industry Fibergrate Composite Structures manufactures and sells the most complete line of high performance FRP products for industrial, commercial and recreational applications.

Circle No. 105

Fogtec

Fire Protection GmbH & Co. KG founded in 1997 concentrates on the development, manufacturing and marketing of fixed and mobile water mist fire fighting systems. All systems are of the high-pressure type using pressures from 80 to 200 bar. The water mist provide is rated Class 1 according to NFPA 750. On going and constant development of FOGTEC technology and its quality are the basis of FOGTEC's policy.

Hook Marine

Hook Marine was awarded the Royal Institution of Naval Architects (RINA)-Lloyd's Register Safer Ship Awards (Industry Class) for the development of a safety indicator for marine cranes. The Kranskan Marine Crane Safety Indicator was developed following testing and examination procedures carried out by sister company and crane specialist William Hook Ltd.

Circle No. 107

MTU

MTU is represented in the area of commercially used high-speed ships, especially in the field of high-speed passenger and car ferries with power outputs from 1,000 to 3,000 kW (1,300 - 3,600 hp) per engine. The propulsion systems in such ships usually comprise two, three or four engines, so that the total power output is between 2,000 and 12,000 kW (2,600 - 16,000 hp).

Circle No. 108

Barkemeyer

Barkemeyer Schiffstechnik GmbH & Co. KG designs and manufactures high-lift flap type BARKE-rudders and BARKE steering gears with advanced control systems. Barkemeyer provides extensive experience in manuvering technology, high precision flap rudders and compact steering gears that function without any compromise in operational performance.

Circle No. 109

NLB

There's a simple solution to virtually every product removal challenge you face: high pressure water jetting from NLB Corp. With NLB water jets (1,000 to 40,000 psi, or 70 to 2,800 bar) you can quickly remove built-up residue or clear hopelessly-clogged tubes and screens. Water jets cut quickly and cleanly through a wide range of materials, without any blades to be sharpened or sanitized.

Circle No. 110

Zistos

Zistos Corporation develops the new industrial Flex'N Stay camera systems. The Zistos line of portable video systems are multi-use video systems designed to be easily transported and used anywhere. Each system consists of three components, a portable display, a flexible camera body and a camera head.

Circle No. 111

Walsport

Walsport manufactures safety videos that help meet CFR, ISM and STCW requirements. As many as 20 videos a case can get you a certificate. The videos facilitate audits and ship vetting.

Circle No. 112

Albacore Research

Albacore Research develops ShipConstructor, an easy-to-use, AutoCAD based product-modeling tool for ships and offshore structures of all sizes. ShipConstructor integrates functions for External Curved Plate Production, Internal Structure, Piping, HVAC, Nesting and NC Processing with a central database that can be tied to purchasing and planning, thus improving product quality and increasing productivity.

Circle No. 113

Viking

Viking produces life-saving equipment that is certified according to the international quality standard DS/EN ISO 9001. Viking now produces an automatically self-righting liferaft for 150 persons. It is the largest-capacity liferaft ever sold: a 150 person automatically self-righting liferaft, type throw-overboard. The size of the liferaft represents the limit so far prescribed by the authorities in terms of liferaft capacities.

Circle No. 114

Schaller

Schaller Automation Blieskastel (SAB) is recognized worldwide as a competent partner for the monitoring and protection of engine crankcase compartments by oil mist detection. SAB has a high technical competence in the area of capacitive sensors as the inventor of it (Pat. DE 16 73 841 C3).

Circle No. 115

Greatland Laser

Rescue Laser Flares are pocket-sized, battery-powered signaling devices that produce a fan-like effect of brilliant red laser light visible up to 20 miles away. Non-flammable, non-hazardous and waterproof to 80 ft.

Circle No. 116

Lang

Lang Manufacturing Company produces the Air Door pizza oven which features an invisible wall of heated air, so it cooks efficiently with the doors fully open. Cooking control is enhanced by upper and lower energy switches for control of top and bottom heating elements. It is loaded with convenience features such as a lift-out crumb tray, interior lighting and a stainless steel exterior.

Circle No. 117

Con-Space

Con-Space manufactures communication equipment that is used in a wide range of difficult and hazardous applications. They are ISO 9001 Certified and are intrinsically safe approved and can be taken to any rescue site. Products include, Con-Space SR65i Radio Accessory.

Circle No. 118

Delta T

Delta T Marine is specifically designed to provide an insulating thermal barrier, personnel protector, and corrosion blocker in an environmentally friendly spray application. The coating system has been used on over 170 vessels worldwide ranging from tractor tugs to aircraft carriers as a thermal insulating barrier system.

Circle No. 119

Spectroline

Spectroline Maxima 3500 UV lamp is powerful enough to spot the fluorescent material in a lifejacket from a much greater distance than is possible with any other lamp. The new lamp uses state-of-the-art micro discharge light technology to produce up to 10 times the UV-A output of conventional lights.

Circle No. 120

Novenco

Novenco's latest innovative product is XFlow, a reliable local protection system for machinery spaces. The technology is based on a combination of fine water droplets and water mist. It does not only offer a faster and safer extinction of engine room fires than any other known system - thereby meeting the latest IMO-standard - it also offers a much better economy, due to a substantial lower initial cost.

Circle No. 121

Load & A-2-B

Load& A-2-B Company has introduced a wireless LMI the Cranesmart System. With no hard wires, cable reels or moving parts. Its fully expandable design allows the user to start with an anti-2-block system, an angle indicator, or a load monitor and upgrade to include any additional component. Bent booms, injured employees and costly downtime and repairs are virtually eliminated.

Circle No. 122

Maritime Progress

Maritime Progress specializes in supplying marine signage, safety posters and safety products. They are established as one of the largest suppliers of photoluminescent signage and a manufacturer of high performance photoluminescent materials. They have a reputation for knowledge of marine safety legislation that resulted in the introduction of the range of safety awareness and training poster.

Circle No. 123

Peters+Bey

J.H. Peters+Bey employed ships-plumbers to produce galley equipment and sheet metal works in the port of Hamburg. This experience led to the manufature of Navigation Lights which had to be developed by the end of the nineteenth century. The number of ships on the waterways resulted in higher traffic rate and reliable Navigation Lights with precise visible distances and accurate light angles became important.

Circle No. 124

Martek

Martek's Centurion is a high level & overfill alarm system designed in compliance with USCG & IMO requirements for tankships. Electrically independent alarm systems for both 95 percent and 98 percent tank levels are housed in the Centurion controller in the cargo control room. Level alarm detection is carried out by MMS500 stainless steel float switches, which come in either dual or single (overfill) versions.

Circle No. 125

The Connecticut Maritime Association Presents

SHIPPING 2003

DON'T STOP THINKING ABOUT TOMORROW

March 17, 18 & 19th
Westin Stamford Hotel
Stamford,
Connecticut

Sponsored by

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The Liberian Shipowners' Council
The Hong Kong Shipowners Association
The International Bunker Industry Association
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Maritime Law Association
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The Baltic & International Maritime Council
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Circle 275 on Reader Service Card

Cruise Industry Gathers in Miami

Every March, the cruise industry gathers in Miami, Fla. for the Sea Trade Cruise Shipping Convention - which usually sometime during March. Just in time to relieve the mid-winter blahs, this year's Convention will be held from March 3-6, 2003 at its "homeport" of the Miami Beach Convention Center. With last year's total attendance tallying in at 10,041, and 1,216 conference delegates, the conference boasted more than 1,000 exhibitors.

Beginning on Tuesday, March 4, from 9 a.m. - 11:30 a.m. will be the ever popular and sometimes controversial, "State of the Industry Debate."

Featuring some of cruise's heavy hitters, such as **Pam Conover**, president & COO of Cunard Line; **Bob Dickinson**, president Carnival Cruise Lines; **Howard Frank**, vice chairman & COO Carnival Cruise Lines; **Gregg Michel**, president Crystal Cruises; **Richard D. Fain**, Chairman & CEO, Royal Caribbean; and **Colin Veitch**, president & CEO, Norwegian Cruise Line, the debate will more than likely focus the subject of the recent merger activities between Carnival and P&O Princess.

On each morning and afternoon of the exhibition, attendees will have a choice of several panels to observe - on all sides of the industry. Participants can familiarize themselves with U.S. Coast Guard activities via the USCG Forum to be held on the afternoon of March 4 from 2:30 - 4:30 p.m.

Participants include CDR Linda Fangan, division chief, Foreign & Offshore Compliance Division; LCDR Rich Pruitt, mass rescue operations program manager, Foreign & Offshore Compliance Division; Lt. Buddy Reams, USCG Marine Safety Center; and Capt. Steve Sawyer, Chief, Office of Search & Rescue. To make reservations for the exhibition, conferences and FCCA Dinner, please contact: CMP Princeton, 125 Village Blvd., Ste. 220, Princeton, N.J. 08540, tel: (609) 452-2800; fax: (609) 452-9374, or e-mail info@cruiseshipping.net. Visitors can also log on to the official web site at: www.cruise-community.com

Industry Leaders Slated to Debate: The leaders of cruise's largest companies will go head-to-head at the annual State of the Industry Debate. From top: **Pam Conover,** president and CEO, Cunard; **Bob Dickinson,** president, Carnival Cruise Lines; and **Richard Fain,** Chairman & CEO, Royal Caribbean.

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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Stork Bronswerk Inc., 3755 C boul.Malte, Brossard, Quebec Canada J4Y2P4
Taylor Made Environmental PO Box 15299 Richmond, VA 23227
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AUTOPILOT SYSTEMS
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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
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Skookum, P.O. Box 280, Hubbard, OR 97032
BOILERS (HEAT RECOVERY)
Deltak LLC 2905 Northwest Blvd Ste 150 Plymouth MN 55441 USA
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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
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Washburn Doughty, P.O. Box 296, E.Boothbay ME 04544
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Autoship Systems Corp., #403, 611 Alexander St., Vancouver, BC, Canada V6A1E
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Kockums Computer Systems AB, PO Box 50555, S-202 15 Malmo SWEDEN
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
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Chesapeake Specialties Products, 5055 North Points Blvd, Baltimore Md 21219
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Hempel Coatings, 10-3511 Viking Way, Richmond, B.C.Canada V6V1W1
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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
Maritel Marine Communications, 16 E. 41st St., NY, NY 10017
Maritime Telecommunications Networks, Inc., 3044 N Commerce Pkwy Miramar FL 33025
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COMPOSITE FENDERING SYSTEM
Hardcore Composites 618 Lambsons Lane New Castle DE 19720
COMPOUNDS
Philadelphia Resins, P.O. Box 309, Montgomeryville, PA 18936

COMPRESSORS
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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
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Japan Radio, 1011 SW Klickitat Way, Bldg B, Suite 100, Seattle,WA 98134
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Rydex: An Inmarsat Ventures Co., 130-13111 Banler Place, Richmond,BC V6V2J1
Sewave, 76 Hennariund Way, Middletown, RI 02842
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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 Ferndale 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 Staurt, FL 34996
COUPLERS- Tug & Barge
Intercontinental Engineering, P.O. Box 9055, Kansas City, MO 64168
COUPLINGS
Acomarin 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 Sheil 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
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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

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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
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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
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DRIVESHAFTS
The Cline Company, 600 Buncombe St., Greenville, SC 29602
DRUG TEST KITS
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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
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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
EMERGENCY LIGHTING
Intensite International Ltd ,Unit 6, Etterick Riverside-Dunsdale Road, Selkirk, Scotland TD7-5EB
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
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DBC, 12351 Bridgeport Rd., Richmond, BC Canada
Fleet Technology 311 Legget Dr Kanata Ontario K2K 1Z8
EVAPORATORS
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EQUIPMENT DISTRIBUTOR
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EXTRUDED RUBBER PRODUCTS
Clean Seal Inc., P.O. Box 2919, South Bend, IN 46880
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Philadelphia Resins, P.O.B. 309, Montgomeryville, PA 18936
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Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA 94402
FASTENERS
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Superbolt, P.O.B. 683, Carnegie, PA 15106
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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)
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Boll Filter, 9822 General Drive, Suite 180, Plymouth, MI 48170
G.E.T., Inc., 3135 Golden Avenue, Long Beach, CA 90806
Heilan Strainer 3249 East 80th St Cleveland, OH 44104
FIRE & SAFETY PRODUCTS
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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
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FLOW CONTROLS
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FLUID SEALING AND PACKING
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FUEL ADDITIVES
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FUEL DECONTAMINATION (www.bunkerbuyer.com)
Algae X Int'l, PO Box 4011, Ft. Myers Beach, FL 33932
FUEL TREATMENTS
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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 DETECTORS
ENMET, PO Box 979, Ann Arbor, MI 48106
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
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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
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Cunningham Marine Hydraulics 201 Harrison St, Hoboken NJ 07030
Offshore Inland 3521 Brookdale Dr.S. Mobile AL 36618
IMO PUBLISHING
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INDUSTRIAL SAFETY
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WQIS, 80 Broad St. 21st Flr., New York, NY 10004
INCINERATORS
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INFLATABLES
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INSPECTION EQUIPMENT
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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
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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
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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
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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
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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
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Boland Industrial & Consulting Services, P.O.B. 91360, Mobile, AL 36691
Hall Associates of Washington, Inc., P.O. Box 1554, Mukiteo, WA 98275
PCS Marine, 174 Colonnade Road S., Nepean, Ontario K2E715

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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
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Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Slipnot Safety Flooring WS Molnar Co. 2545 Beavfait St., Detroit, MI48207
MARINE ELECTRONICS
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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 Klickitatway 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
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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
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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
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METERS
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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
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Machine Support 1932 Mill Pond Dr Chesapeake, VA 23320
NAVAL ARCHITECTS, MARINE ENGINEERS
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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
Chartco, New North Road, Hainault, Ilford Essex, 166 2UR England,UK
Electronic Marine Systems, 800 Femdale 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)
Steam'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 Fornace 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
Steams 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 Femdale 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 Bulfum 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
Kobelt 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
Schmidt, P.O. Box 37, Fresno TX 77545
Spectrum Trading 108-B Oak St, Alpharetta GA 30004
SURVEYORS
Capt. R.J. Underhill & Assocs.,P.O.Box 1030 Groves,TX 77619
SURVIVAL EQUIPMENT
Brookdale International 1-8755 Ash St Vancouver BC Canada V6P6T3
SWIRL OFF SCARIFIER
Desmond Stephan Mfg PO Box 30Urbana OH 43078
TANK GAUGING SYSTEMS
TankTech Co.,368-3 Yangdong-Ri, Juchon-Myon, Kimhae City, Kyongnam, Korea
TANK LIQUID GAUGES
Technical Marine Services, 6040 N. Cutter Circle, Portland, OR 97217
TANK LEVELING INDICATORS
Electronic Marine Systems, 800 Femdale Pl., Rahway, N.J. 07065
ERL Marine Products div, PO Box 1026, New Albany, IN 47151-1026
King Engineering Corp., P.O. Box 1228, Ann Arbor, MI 48106
MMC International, 60 Inip Dr, Inwood NY 11096
Prime Mover Controls 3600 Gilmore Way Bumaby V5G 4R8 Canada
Saab Marine Electronics AB, P.O. Box 13045, S-402 51 Goteborg SWEDEN
Technical Marine Service, 6040 North Cutter Circle, Portland, OR 97217
TESTING SERVICES
Fleet Technologies, 311 Legget Dr., Kanata, Ont, K2K 1Z8 Canada
Wyle Laboratories, 7800 Govern's Dr. S.W., Huntsville, AL 35807
THRUSTER SYSTEMS
Jan Verhaar 2340 Ac Oegstgeest Holland
Omnithruster Inc., 30555 Solon Ind. Pkwy., Cleveland, OH, 44139
TOPSIDE REPAIRS
Offshore Inland 3521 Brookdale Dr S Mobile, AL 36618
TORSIONAL VIBRATION SPECIALISTS
T.W. Spaetgens, 186 W. 8th Ave., Vancouver, BC, CANADA, V5Y 1N2
Vibranalysis Engineering Corp., 9300 Gamebird, Houston, TX 77034
TRAINING
International Maritime Training 910 SE 17th St., Ste. 200, Fort Lauderdale FL 33316
Marine Safety Marine Air Terminal Laguardia Airport, NY 11371
RTM Star Center 2 West Dixie Hwy, Dania FL 33004
Sea Technology, 6386 Three Notch Road, Mobile, AL 36619
TRANSMISSIONS
Karl Senner Inc., 25 W Third, Kenner LA 70062
ZF Marine Group 3131 SW 42nd St., Ft. Lauderdale, FL 3312
TURBOCHARGERS—Repairs
ABB Turbocharger Co 5401 Baden Switzerland
Motor Service-Hugo Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
Napier Turbochargers, PO Box 1, Waterside South Lincoln LN5 7FD England
ULTRASONIC HOMOGENIZER
VOLMAR s.a.s. Viale Lombardia 241, 20047 Brugherio (MI) Italy
ULTRASONIC TESTING
M.A.C.E., 5910 N.E. 15th Ave., Fort Lauderdale, FL 33331
Muldoon Marine Services, PO Box 41340, Long Beach, CA 90853
ULTRASONIC THICKNESS GAUGES
Cygnus Instruments PO Box 6417 Annapolis, MD 21401
UNDERSEA CABLE CHARTS
Concert Undersea Cable, 340 Mt. Kemble Ave, Morristown, NJ 07960
UNDERWATER CAMERAS
VideoRay LLC, 415 Engleview Blvd., Exton, PA 19341
VACUUM EQUIPMENT
Vector Technologies, 6820 N. 43rd St., Milwaukee, WI 53209
VACUUM TOILET SYSTEM
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
Jets Vacuum Sewage System, P.O. Box 14, N-6060 Hareid, NORWAY
VACUUM CONVEYORS
Vector Technologies, 6820 N. 43rd St., Milwaukee, WI 53209
VALVES AND FITTINGS
Leslie Controls, 12501 Telecom Dr., Tampa, FL 33637
MMC International, 60 Inip Dr, Inwood NY 11096
William E Williams, 38-52 Review Ave.,LIC, NY 11101
VAPOR RECOVERY CONTROLS
Electronic Marine Systems, 800 Ferndale Pl., Rahway, N.J. 07065
VENTILATION SYSTEMS / PRODUCTS
Delta T Systems, PO Box 9159, Jupiter, FL 33468
VIBRATION ANALYSIS
LUDECA 1425 NW 88th Ave Miami FL 33172
Maritech, LLC, 100 Powdermill Rd., Acton, MA 01725
Vibranalysis Eng. Corp., 9300 Gamebird, Houston,TX 77034
VIBRATION CONTROL PRODUCTS
Lo-Rez Vibration 186 W. 8th Ave Vancouver BC Canada V5Y1N2
VISCOMETERS
Cambridge Applied Systems, 196 Boston Ave., Medford MA 02155
VOYAGE DATA RECORDER
L-3 Communications, 6000 Fruitville Road, Sarasota, FL 34232
WASTE WATER TREATMENT
Airvac, 4217 N.Old U.S. 31, Rochester, IN 46975
Envirovac, 1260 Turret Drive, Rockford, IL 61111
Fast Systems, 8450 Cole Parkway, Shawnee, KS 66227
RWO,Leerkampe 3, D-28259 Bremen, Germany
WATER JET CLEANING
Flow Int'l., 23500 64th Ave.South Kent, WA 98032
Gardner Denver Water Jetting Systems 8807 Emmett Rd, Houston, TX 77040
WATER PURIFIERS
Alfa-Laval Separation Inc., 955 Mearns Rd., Warminster, PA 18974
Gardner Denver Water Jet Systems 8801 Emmett Rd, Ste100, Houston TX 77040
Pall Rochem, 5775 Rio Vista Drive, Clearwater, FL33760-3114
Reverse Osmosis of South Florida, 150 SE 29 St., Ft Lauderdale, FL 33316
WATERTIGHT CLOSURES
Walz & Krenzer, 91 Willenbrock Rd. Unit 4, Oxford, CT. 06478
WEATHER INSTRUMENTS
Aanderaa Instruments, Fanaveien 13B, 5050 Nesttun, Bergen, Norway
WEATHER PROTECTIVE CLOTHING
Carhartt Inc., 3 Parklane Blvd., Dearborn MI 48121
WEATHER SERVICES
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Stelmar Announces Charters For Newbuilds

Stelmar Shipping Ltd signed two-year time charter contracts for two double-hull Panamax newbuildings expected to be delivered in late 2003 and early 2004. **Adrian McMahon,** Managing Director of Stelmar Tankers (U.K.) Ltd., said, "We continue to see a strong demand for our modern vessels." The two Panamax tankers, which were signed at profitable rates, are part of the company's 2003 and 2004 newbuilding program for five Panamax tankers. The newbuilding program will make Stelmar the largest owner of modern Panamax tankers and position the Company for future growth in 2004 and 2005. Stelmar also announced that it has renewed the profitable time charter contract for the Fulmar, a 1989 double hull product tanker, for an additional year at a higher rate.

Stelmar has secured 70 percent of the net operating days of its fleet on profitable time charters for 2003 and 31 percent for 2004, equivalent to $122 million and $60 million in revenues respectively.

IBIA Warns on EU Tanker Proposals

THE International Bunker Industry Association (IBIA) says that proposals by the European Commission for a EU ban on single hull tankers may inadvertently have a major affect on bunkering operations.

Ian Adams, secretary general of IBIA, says, "The European Commission has proposed a new regulation amending regulation 417/2002 which bans entry into EU ports, offshore terminals or anchorage areas under the jurisdiction of a Member State of single-hull tankers transporting "heavy grades of oil." This measure would apply to oil tankers of 600 dwt and above. As drafted, this would effectively outlaw a significant proportion of the current EU bunker barge fleet, as many bunker barges are in effect small tankers within their definition. We believe it could lead to significant supply problems for shipping in EU ports, and we will be asking the Commission to reconsider its proposal, and exclude "small tankers used in the fuelling of ships" from the proposals." Adams says that IBIA is canvassing its members to see how many barges would be affected, and the impact of the current draft regulations would be.

BP Awards Plutonio FPSO Class to Bureau Veritas

U.K.-based oil major BP has awarded the classification and verification services for its giant Plutonio FPSO to Paris-based Bureau Veritas. The Plutonio FPSO will have a two-million barrel storage capacity and is intended to handle 220 mbd per day over a 25-year life span. It will service five fields in Block 18 offshore Angola, operating in very deep water.

Following Sonangol's approval, BP will be putting the building contract for the Plutonio FPSO out to tender. When on stream in 2007, it will be anchored in deep waters in the South Atlantic Ocean with subsea tie backs to the five fields it will serve.

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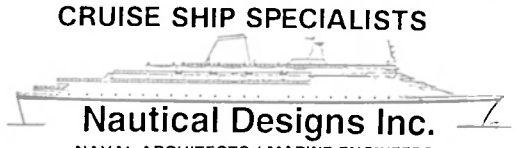

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Staffed by ABB factory-trained technicians, our repair facilities offer swift handling of your maintenance concerns by people you know you can trust. With the help of our computer network, ABB technicians can access your turbocharger's complete history to aid in speedy diagnosis. They can then utilize our locally maintained stocks of genuine ABB parts or go on-line to rapidly locate necessary parts in our worldwide inventory.

You asked for the best in service, and we delivered. But you would expect nothing less. After all, we design and build the industry's most efficient turbochargers. It's only natural that we also offer the finest in repair and maintenance service, worldwide.

We Design It... We Build It... We Service It Best!

ABB Turbochargers

U.S. Headquarters*
1460 Livingston Ave., North Brunswick, NJ 08902
24 Hour Service: (732) 932-6103
Telefax: (732) 932-6378

***ISO 9002 Certified Facilities**

ABB Turbocharger U.S. Service Centers:

*Houston	(281) 930-8383	Fax: (281) 930-9595
*Los Angeles	(310) 324-4814	Fax: (310) 324-5102
*Miami	(954) 450-9544	Fax: (954) 450-8957
*New York	(732) 932-6103	Fax: (732) 932-6378
*Seattle	(253) 383-1806	Fax: (253) 383-1270

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