

February 2006

**MARITIME  
REPORTER**  
AND  
ENGINEERING NEWS

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**W&O Supply Propelled to New Heights**

**Q&A**

**Radio Holland CEO David A. Slager**

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**MARITIME REPORTER AND ENGINEERING NEWS**

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## Editor's Note

I am the last person in the country you would want to approach for sports gambling advice (legal or otherwise!), as I have a long and consistent track record, for example, of always picking the Super Bowl loser. (This is topical, of course, because the Super Bowl is fast approaching as we go to press, and because of the demoralizing picture you will find on page 8). Simply put, I tend to pick with my heart rather than my head.

The same does not hold true in all other aspects of my life, as I tend to be more analytical in other areas, particularly in regard to business. That said, all bets are off regarding the continued trend toward consolidation. Just when you think you've seen the big get as big as they possibly could, another acquisition hits the headlines. In this instance, I reference the recent purchase of the French shipbuilder Alstom Marine by Aker Yards, which essentially teams a combined Scandinavian and French cruise shipbuilding team determined to take market share from Italy's Fincantieri.

The cruise market is looking vibrant, as vibrant as it has post-9/11. While there is palpable excitement regarding recent orders and coming deliveries, notably a \$2 billion plus order logged by Fincantieri for Carnival Corp., and the pending delivery of the world's largest cruise ship — the 158,000-ton Freedom of the Seas being built for Royal Caribbean at Aker's Turku yard — this April, there are also some very serious challenges to address. Chiefly, the issue of Maritime Security in regards to potential terrorist attacks on cruise ships is ubiquitous, and will continue to affect the way in which cruise ships are outfitted and operated. While fruitless to speculate on such matters, the industry can ill-afford to ever let its guard down, continuing to stay abreast of the latest technologies to keep ships safe. Cruise operators are also engaged in a very public debate regarding the safety of passengers while onboard their ships, as a number of recent crimes and missing passengers have been grossly overplayed by the mainstream media. While any such incident is unwanted and unfortunate, lost is the fact that the overwhelming majority of cruise ship passengers enjoy a peaceful and safe journey. Regardless, the industry must step up its public efforts to ensure its message is getting across.



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## On the Cover



**On the Cover:** Pictured on this month's cover is the first 158,000 gt cruise ships for Royal Caribbean International, MS Freedom of the Seas, is due for delivery from Aker's Turku shipyard in April. Two sisterships will be delivered in 2007 and 2008. **See story on page 20.**

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# MARITIME REPORTER

AND  
ENGINEERING NEWS

www.marinelink.com

ISSN-0025-3448  
USPS-016-750

No. 2

Vol. 68

118 East 25th Street, New York, NY 10010  
tel: (212) 477-6700; fax: (212) 254-6271

Founder: John J. O'Malley 1905 - 1980  
Charles P. O'Malley 1928 - 2000

Maritime Reporter/Engineering News is published monthly by Maritime Activity Reports, Inc. Mailed at Periodicals Postage Rates at Waterbury, CT 06701 and additional mailing offices.

Postmaster send notification (Form 3579) regarding undeliverable magazines to Maritime Reporter/Engineering News, 118 East 25th Street, New York, NY 10010.

Publications Mail Agreement No: 40024966  
Return Undeliverable Canadian Addresses to  
Circulation Dept. of DPGM  
4960-2 Walker Road  
Windsor, ON N9A 6J3

Publishers are not responsible for the safekeeping or return of editorial material. ©2005 Maritime Activity Reports, Inc.

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Lloyd's  
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## Leading Off



### "I Lost"

Pictured are W&O Supply CEO (and prolific Pittsburgh Steeler fan) **David Turner** (left) and MR Associate Publisher (and Cincinnati Bengal fan) **Greg Trauthwein**. A friendly wager was laid on the first round NFL play-off game between the Cincinnati Bengals and the Pittsburgh Steelers. Turner's Steelers won, and I "paid up" during a recent visit to W&O Supply in Jacksonville. The price: donning a jersey of one of my most loathed childhood football rivals for this photo op.

## Maritime Art Sales Hit Record at Christie's

A recent Maritime sale at Christie's New York totaled \$3,361,680, achieving the highest ever total for a maritime sale at Christie's. During the proceedings, a new world auction record was set for **Montague Dawson**. Marie Kotsonis, Maritime Picture Specialist and Gregg Dietrich, Maritime Models, Ephemera and Scientific Instrument Specialist, Christie's Americas, said "Today's auction achieved the highest total ever for a Maritime sale at Christie's. The buoyancy of the market brought new private clients to the category, competing with our established clientele. Most importantly we are ecstatic about the new Montague Dawson record price for lot 295, depicting the action between the Shannon and the Chesapeake. Bringing an outstanding result of \$486,400."



Sample of Montague Dawson's work. "A clipper ship in a moonlit sea" (source: [www.richard-green.com](http://www.richard-green.com))

Some of the Montague Dawson's (1895-1873) work sold included:

- *The action between H.M.S. Shannon and the U.S.S. Chesapeake*, oil on canvas - Price \$486,400
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## Rigdon to Build PSVs at Bollinger



Rigdon Marine's new GPA654 Class PSV to be built at Bollinger Shipyards, Lockport, La.

Bollinger Shipyards signed a multi-vessel contract with Rigdon Marine to build 10 platform supply vessels (PSV) for Rigdon Marine, based on a new GPA 654 Class, designed by Guido Perla & Associates. The design incorporates increased carrying capacity and greater operating efficiency, compared to similar sized vessels, while at the same time allowing simplified construction methods to reduce construction cost. All ten are planned to be built at Bollinger's Lockport La. facility.

Donald "Boysie" Bollinger, chairman and CEO of Bollinger said, "We are excited about our upcoming program with Rigdon Marine. I have worked along side of Larry and several of his team members for many years. The timing of this state of the art PSV program is ideal for both of our organizations, and I am confident that this program is only the first of several to come."

The GPA 654 Class of PSV is a newly designed vessel that measures 190 x 46 x 18-ft. The vessels will be diesel-electric

and classed ABS +A1+AMS+DP2, USCG Subchapter L and SOLAS.

Larry Rigdon, president and CEO of Rigdon Marine Corporation said, "Our organization is committed to the redevelopment of the State of Louisiana and having the next phase of our building program in Louisiana and at Bollinger is another reinforcement of that commitment." To double the size of its existing fleet of 10 PSVs, Rigdon Marine recently completed a series of financial transactions which strategically positioned the company for growth. It signed a \$170 million Credit Facility with a group of European banks led by DVB Bank and secured \$30 million in equity investment.

The newly restructured Rigdon Marine Corporation has replaced its original financial capitalization for the recently completed GPA 640 series of 10 platform support vessels and has obtained additional financing for a new series of 10 vessels, which it has on a firm contract with a Bollinger.

### MAN B&W Diesel Debuts New 51/60DF Series

The MAN B&W Diesel Group is launching a new four-stroke engine onto the market that burns both gas and MDO (Marine Diesel Oil), and can also run long-term on pure HFO (Heavy Fuel Oil).

The 51/60DF (Dual Fuel) engine is based on the 48/60B range, tried and tested in both marine and stationary applications.

The 51/60DF is currently the largest four-stroke gas engine on the market and is to be incorporated in all its versions into the MAN B&W Diesel product portfolio in a spectrum ranging from the six-cylinder in-line engine to the 18-cylinder V-engine.

A special common rail pilot oil injection system helps make the engine more environmentally friendly. The available engine power ranges from 6,000 to 18,000 kW.

The 51/60DF is aimed at the LNG tanker market, and also for base load electricity generation in power stations with a good gas connection. The first series-produced engines will be dispatched in mid-2007.

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## Protection on board



### S-separator

Norddeutsche Reederei charters to Hapag-Lloyd feature S-separators, which reduce sludge volumes through an optimized bowl design and CentriShoot discharge system. Their CentriLock system replaces the threaded lock ring with a wear-minimizing snap ring.

Ship owners like Hapag-Lloyd have high performance expectations. This is why owner Norddeutsche Reederei H. Schuldt uses Alfa Laval S-separators on its long-term charters to Hapag-Lloyd and other companies.

"We get truly effective fuel oil treatment from our S-separators," says Norbert Haiplick, Norddeutsche Reederei's Superintendent. "With their unique bowl design and their CentriShoot discharge system, they wear less and produce less sludge than conventional models."

Jürgen Hansen, Norddeutsche Reederei's Technical Director, is also satisfied. "It feels good to work with a committed separation partner," he says. "Alfa Laval's involvement in the Separation Performance Standard is creating a better margin of engine safety."

For more on S-separators, the Separation Performance Standard or our work with Norddeutsche Reederei H. Schuldt, visit us at [www.alfalaval.com/marine](http://www.alfalaval.com/marine)



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## Iran to Have 59 Tankers by 2008

The National Iranian Tanker Company (NITC) said in a report on [www.mehrnews.ir](http://www.mehrnews.ir) that the number of Iran's oil tankers would increase to 59 by the next two years after receiving all domestic or foreign orders. Iran has ordered some 17 oil tankers from foreign companies. Korean Daewoo Corporation, Honda and Samsung are each scheduled to build three 300,000

ton oil tankers. Four 160,000-ton oil tankers are to be built by the Honda Samhu Company, which will be gradually delivered until the year 2008. In addition to these 17 oil tankers, some other 11 oil tankers are also scheduled to be built by the Iranian companies.

## China Ranks 3rd with 12 Million DWT in 2005

China's shipbuilding capacities have reached 12 million deadweight tonnages

(DWT) in 2005, up 36 percent year-on-year, to be ranked third largest worldwide, according to the Commission of Science Technology and Industry for National Defense in a report on [www.chinaknowledge.com](http://www.chinaknowledge.com). The commission said China received record high shipbuilding orders of 15 million DWT last year. The sales revenue of all the country's shipbuilding companies reached a total of about \$12 billion with an industry profit of more than \$371.6

million and a ship export value of more than \$4 billion. China State Shipbuilding Corporation and China Shipbuilding Industry Corp., one of the country's biggest conglomerates in the industry, built 5 million and 3 million DWT of ships respectively in 2005.

## Damen Receives Jumbo Order



Picture of a similar vessel.

Damen Shipyards Gorinchem won a contract from the Dutch Shipowner, Jumbo Navigation for the construction and delivery of a Heavy Lift Vessel. Two vessels of similar design named "Jumbo Javelin" and "Fairpartner" were delivered by Damen to Jumbo in 2004.

The order is the result of the growing demand in the oil and gas industry onshore and offshore and is intended to load and discharge heavy objects via a lift on/lift off method by means of two cranes of 800 ton each. The vessel is able to transport cargoes with unrestricted length and width on the main deck hatches and is also certified for sailing with open hatches.

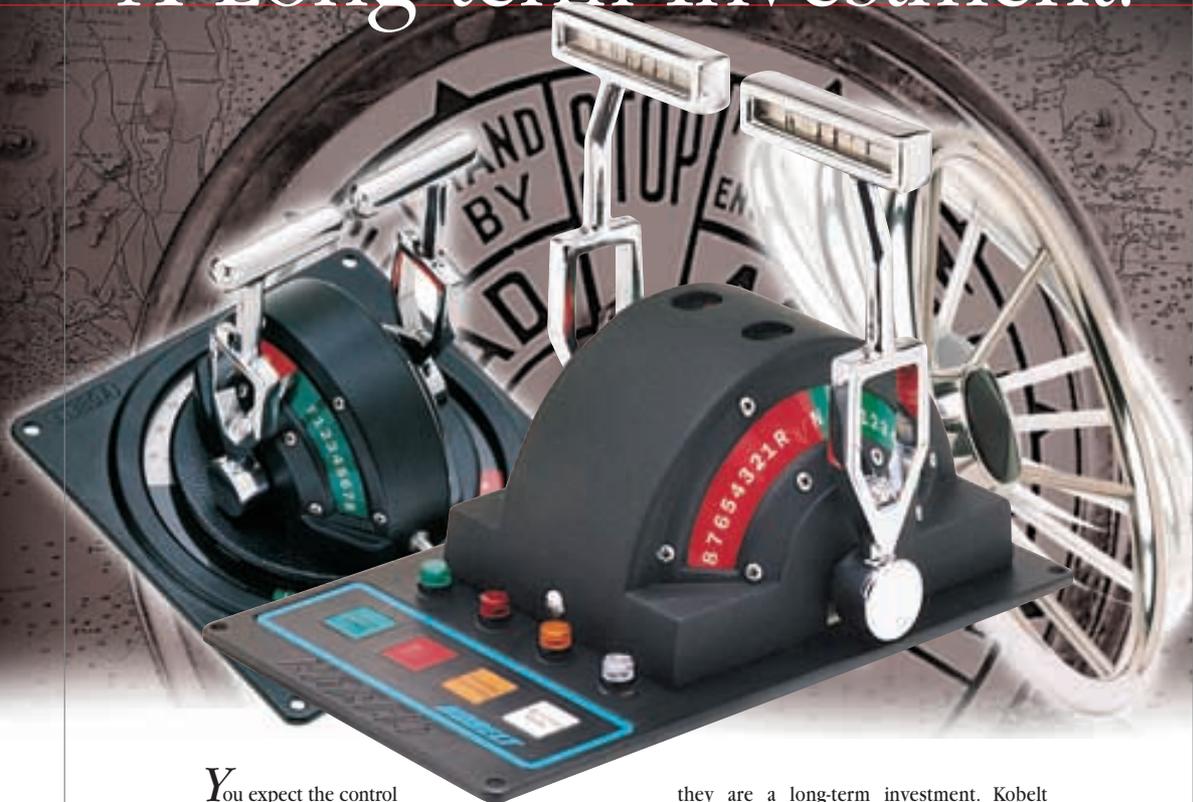
It will measure 144.6 x 26.5 m, with a 14.1-m depth. The design draft will be 6.5 m, max., with a 8.1-m draft with corresponding deadweights of approximately 8,200 and 13,000 tons.

Propulsion is via two 4,500 kW diesel engines driving two 4.35 m controllable propellers, giving the ship a speed of approx. 17.5 knots. The installation will be suitable to run on heavy fuels.

Two 1,450 kW tunnel thrusters and one 1,700 kW retractable thruster provides the necessary side thrust for maneuvering, station keeping and DP operations. Classification includes a DP-2 notation from Lloyds Register of Shipping. Electrical power is generated by two 3,000 kW shaft generators and three dedicated diesel generator sets of respectively 2 x 2,281 and 1 x 550 kVA.

The cargo cranes will have a lifting load of 800 ton with a maximum reach of 28 m over starboard side and 32 m over port side. The ballast system will provide the possibility to counter act crane operations by means of 3 x 700 cu. m./hr. pumps. Additionally stability

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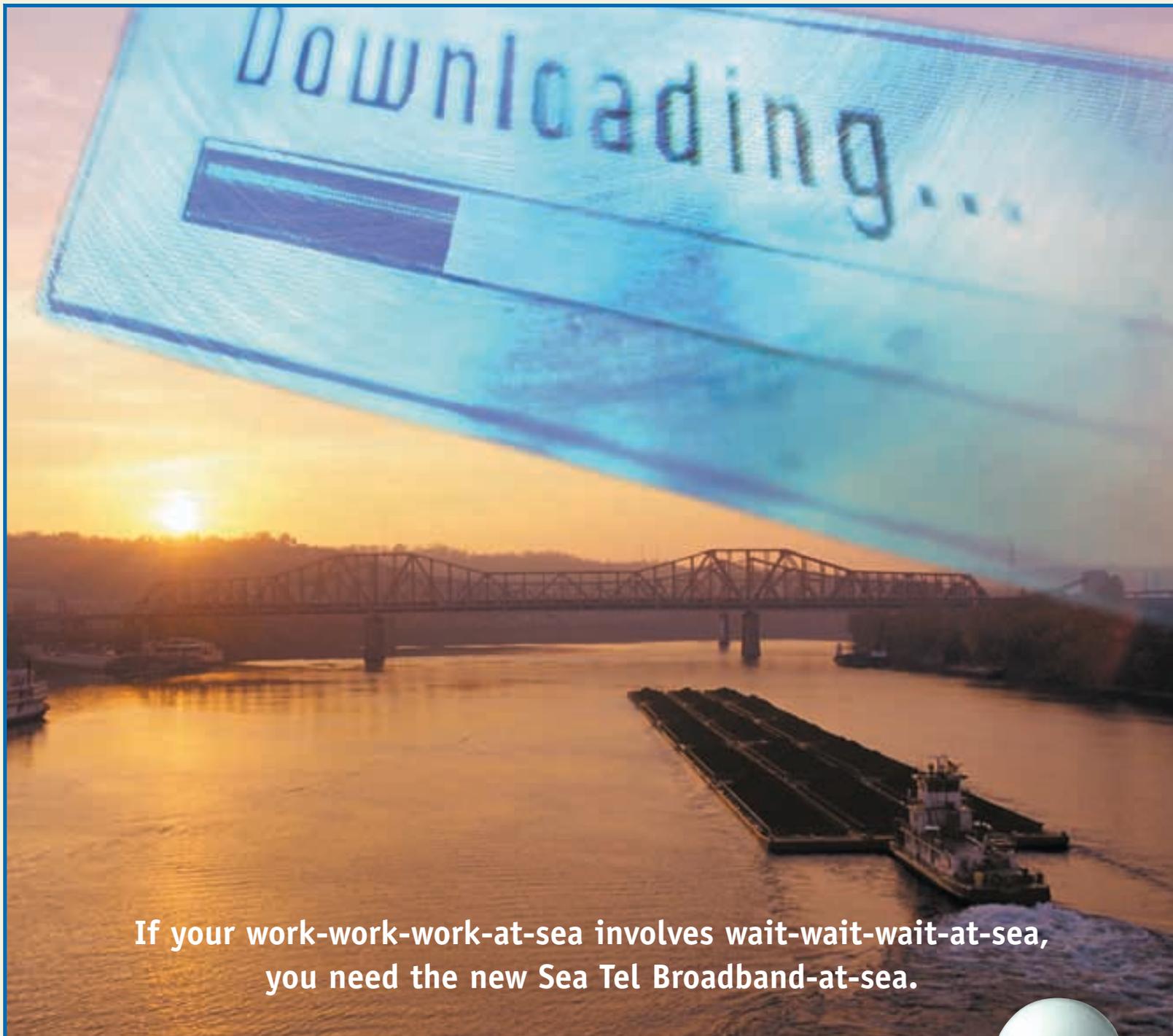
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Cost/MB	<b>\$1</b>	\$16.53 ISDN \$36.00 MPDS	\$18.60 (\$9.00/min)
Cost/GB	<b>\$1,000</b>	\$16,640 ISDN \$36,000 MPDS	\$18,720

4.15.03. <sup>1</sup> Source: KVH website <sup>2</sup> Source: Delta Communications website

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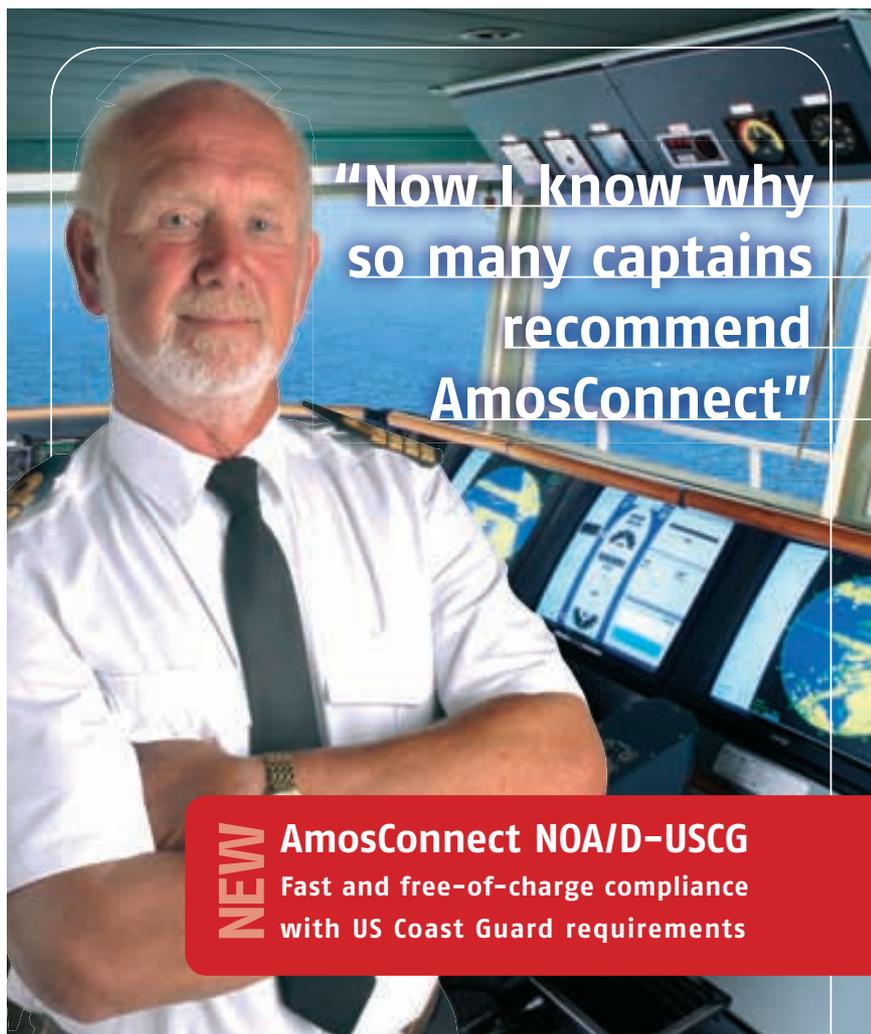


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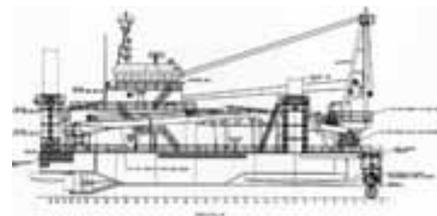


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pontoons will be provided in order to be able to lift 1,600 ton on a reach of 14 m.

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### Bollinger to Build Two ECO Liftboats



Profile drawing of the Bollinger 245-ft Class Liftboats.

Bollinger Shipyards and Edison Chouest Offshore entered into an agreement that will propel Chouest into the liftboat market. The two 245-ft class liftboats, Bollinger hull 515 and 516, are

based on a Bollinger design that is American Bureau of Shipping (ABS) classed and USCG certified subchapter L, meeting SOLAS/MARPOL requirements. The vessels will be flagged U.S. and will primarily operate in the Gulf of Mexico.

### VT Halter to Build Fourth NOAA Vessel

VT Halter Marine, Inc. will build another fisheries survey vessel (FSV) for the National Oceanic and Atmospheric Administration (NOAA). NOAA exercised an option for about \$30 million to build the fourth planned vessel under an existing contract. Construction will begin in 2006 with delivery planned during the second half of 2008. The first ship in the class-Oscar Dyson-was delivered on Jan. 5, 2005.

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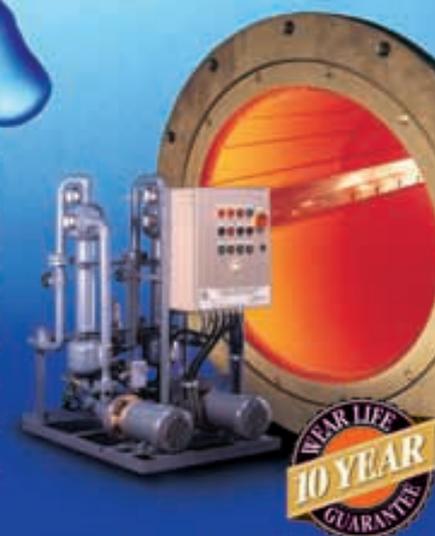


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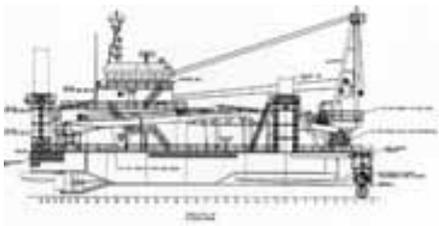


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of 2008. The first ship in the class-Oscar Dyson-was delivered on Jan. 5, 2005.

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## Bollinger to Build Two ECO Liftboats



Profile drawing of the Bollinger 245-ft Class Liftboats.

Bollinger Shipyards and Edison Chouest Offshore entered into an agreement that will propel Chouest into the liftboat market. The two 245-ft class liftboats, Bollinger hull 515 and 516, are based on a Bollinger design that is American Bureau of Shipping (ABS) classed and USCG certified subchapter L, meeting SOLAS/MARPOL requirements. The vessels will be flagged U.S. and will primarily operate in the Gulf of Mexico. The three cranes will include a port bow mounted primary crane with a 110 ft, lattice boom rated for 175 tons; a starboard bow telescoping auxiliary crane rated for 50 tons, and a box boom crane mounted on the starboard stern rated for 25 tons. Equipped with 245-ft. legs, the self-propelled floating platform will have the ability to work in water depths to 180 ft. with a 15-foot air gap while lifting a total of 950 KIPS of variable load. "We are excited to be builder for Chouest, our long time family friend and customer. Chouest's confidence in our design is a tremendous statement and tribute to our employee's dedication and pride for building the best vessels in the region." Said Donald "Boysie" Bollinger, chief executive officer and chairman of Bollinger Shipyards, Inc.

The vessels will be built at Bollinger Lockport facility, with deliveries scheduled for first quarter of 2007 and second quarter 2007.

## Moose Makes Waves for U.S. Inshore Patrol

A Californian built fast patrol catamaran is gaining a reputation as the ideal vessel for inland waterway security. Moose Boats, an aluminium boat manufacturer in Petaluma, Calif., recently won several contracts for its Moose

340C Catamaran Patrol boats for security services across the U.S. Last November, Moose Boats delivered a 340C to the U.S. Navy NAVSEA and received an additional contract for a second 340C to be assigned to the Naval Air Warfare Center Aircraft Division (NAWCAD), Patuxent River, MD.

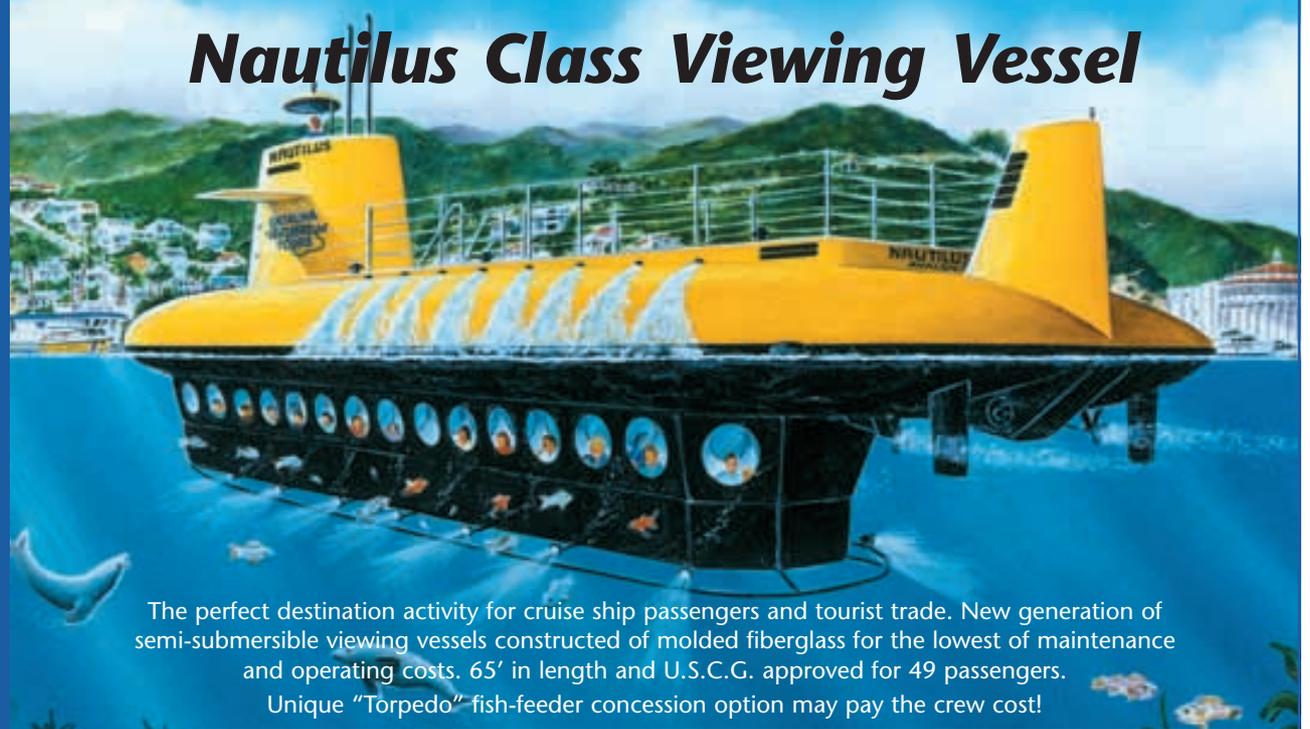
Earlier in 2005 the Department of

Transportation, MarAd, ordered two of the 11m (37.5 ft.) vessels for security at the Suisun Bay Reserve Fleet located in Benicia, Calif. The Suisun Bay Fleet consists of dry cargo ships, tankers, military auxiliaries and other types of reserve ships in the custody of the Maritime Administration. The Moose 340C is powered by twin Cummins

380hp turbo diesels and Hamilton HJ292 waterjets. This vessel has a top speed of over 34 knots, cruises at almost 30 knots. The waterjets provide the benefits of powerful acceleration and deceleration, smooth and vibration-free ride, sharp high-speed turns and the full range of low-speed maneuvering options.

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## Nautilus Class Viewing Vessel



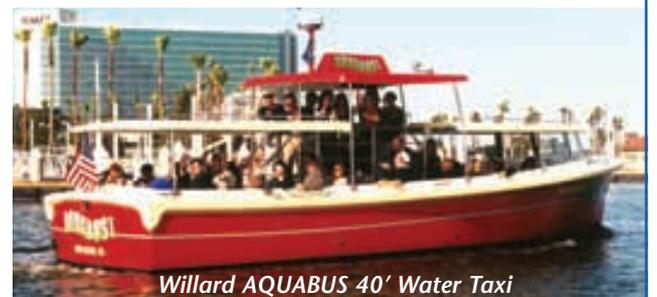
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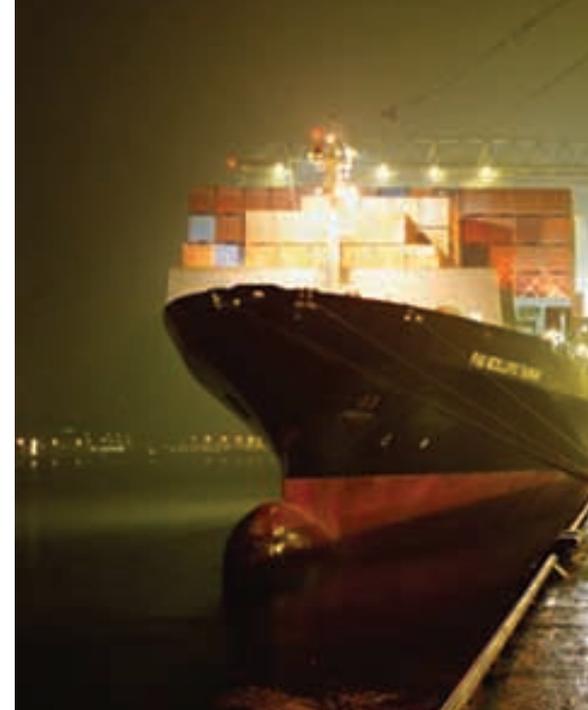


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# Company Profile: Stratos

Stratos was formed by two entrepreneurs and initially began as two separate entities: a data communications business (known as Ultimateast Data Communications) and a two-way radio technology company (called Sea Link). Each company was formed with the goal of meeting the communication requirements of the maritime community; Sea Link providing radio telephone call services for fishing, oil, and mining operations; Ultimateast providing com-



puter services for fishing trawlers and other maritime customers. The companies operated separately, but were owned by the same investors, and many of the products developed at Ultimateast were used to provide services to Sea Link customers. As Sea Link moved into selling Inmarsat satellite equipment and airtime to maritime customers, the decision was made to fold Sea Link and Ultimateast into one company called New East Wireless Telecom. Its new focus was to become a value-added reseller of satellite communications services. This company would later be renamed as Stratos. Today, Stratos is headquartered in Bethesda, Md., with more than 600 employees in offices worldwide. The company has stayed true to its maritime beginnings; maintaining a strong relationship with shipping and fishing fleets by providing high-speed voice and data solutions for crew calling and fleet management. Customers include blue-water fishing and cargo fleets such as Hong Kong's Wallem Group, Worldwide Shipping, Teekay Shipping, and the Marine Contracting Association Limited. One of the most important components of Stratos's product offering is the Fleet F77 system. Manufactured by Inmarsat, a separate communications company, the Fleet F77 system is the latest-generation Inmarsat maritime communications solution. It is ideally suited to larger vessels (such as merchant and cargo ships, tankers, and super yachts) which require a complete office at sea, and is designed to provide a single integrated platform to support both dedicated, high-speed ISDN and always-on mobile packet data service (MPDS), as well as voice and Group 3 and 4 fax services. According to the company, Stratos is one of the world's largest providers of the Fleet F77 product. Installed on an oil tanker owned by Hong Kong's Wallem Group, the system proved its ability to integrate Wallem's existing systems; specifically, shipboard

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usage and provides ship-owners with an itemized report similar to a mobile phone bill. The report could be used to segment charges by usage groups; such as master, crew and Wallem itself.

"The big challenge for Wallem has always been the question of how to link modern technology solutions to vessels at sea. Inmarsat's new Fleet F77 has

proved a solution to that problem," said Patrick Slesinger, the chief information officer of the Wallem Group, adding that the pricing model accompanying the system (where users are charged for the amount of information sent and received rather than the connection time) was especially attractive to the company.

Stratos spokesman Doug Gunster said,

"Now ships can become a connected node to their company's LAN or WAN network, offering the flexibility and reliability of constant communication with their home office. The ship can conceivably now have access to the same company infrastructure and resources available to their land-based counterparts."

**Circle 41 on Reader Service Card**



systems with headquarters solutions that control procurement and provisioning of all vessels under management. Wallem reports that the system has also improved the quality of life of the ship's officers and crew by putting them in immediate touch with the outside world and relatives via e-mail and digital news services. Wallem used the Fleet F77 system with service provided by Stratos, and a host of applications to test the Inmarsat network in real-world conditions. The vessel tested three specific types of applications covering the areas of communications, operations and management. To test communications, Inmarsat, Stratos and the Fleet F77 system supported a range of features and functionalities including regular voice, e-mail, and an SMS solution. The system also featured NewsLink, which provides officers and crew with tailored news headlines and stories in a range of languages reflecting the nationalities of the crew on board. NewsLink also provided connectivity to Wallem's own web portal and other web sites.

For the operations application, Wallem evaluated the performance of key safety and insurance activities, such as detailed, full-color weather reports and the transmission of procedures manual updates. The operations testing also covered what Wallem calls "abstracts"; including engine performance data, fuel states, and cargo updates.

Testing the management of the system was essentially a matter of bandwidth control. While making Inmarsat Fleet F77 service available to the entire crew is desirable from a morale standpoint, doing so would make it difficult to properly manage the bandwidth as well as correctly charge the individual users or applications for their usage. To solve the problem, Wallem commissioned its own solution development operation, DevCo, to create a brand new management application, called Packet Counter.

Although still at the prototype stage at press time, Packet Counter tracks data

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**FORM** (SeaWave Form Transmission): Improve the way data is transferred between ship and shore – Send data, not costly format overhead.

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### New Sat Phone Kit

Delta Wave Communications released its new ST2900FIP portable satellite phone system, which has passed Globalstar's testing and is now a Globalstar certified product. Designed specifically for the Offshore Oil and Gas Industry, it is a turnkey Globalstar satellite phone that was designed for quick and easy deployment. It also has terrestrial applications where customers require communications where land lines or cellular service do not exist. The below-decks equipment is housed in a NEMA enclosure that requires minimal space for installation. The kit includes a corded and cordless handset system that is connected to a standard RJ11 port. Though a corded/cordless phone set is included, it may also be ordered without one. The RS232 data port offers e-mail and internet connectivity at speeds of up to 56kbps when using Globalstar's Express Data package. All data software is included in the package.

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### Vessel Tracking, Weather and Communications On One Screen

SkyMate introduced a system for fleet operation managers that displays vessel tracking, weather condi-

tions and communications on one computer screen. Nobeltec's Fleet Manager powered by SkyMate, is designed to automatically download the latest positions of tracked vessels directly into Nobeltec's Admiral navigation program.

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### \$110M Invested in ORBCOMM

Pacific Corporate Group LLC, a private equity investment, fund management and advisory firm, has led an equity financing round totaling more than \$110 million for ORBCOMM, the Dulles, Va.-based provider of global satellite telecommunications services. "Our investment in ORBCOMM reflects our strategy of investing in well-managed, established companies that have significant growth potential," said Tim Kelleher, a Managing Director of Pacific Corporate Group. "ORBCOMM is a leading player in satellite telecommunications that has positioned itself for rapid growth based on global coverage, reliable service and competitive pricing. ORBCOMM is developing several new applications in important areas such as homeland security that enhance the ability to track ships and hazardous cargoes, including a pilot program with the

### SeaMobile, Caprock Enter Alliance

SeaMobile, a provider of at-sea wireless voice and data communications, formed a strategic alliance with CapRock Communications, a global satellite communications company, which results in the companies providing unique communication solutions for commercial cruise lines and their passengers. This service will allow crew and passengers to use personal cell phones, wireless PDAs or wireless enabled computers while at sea in the same manner they currently use them on land. According to the companies, the alliance virtually eliminates coverage area restraints due to SeaMobile's roaming agreements and CapRock's global satellite coverage. It also adds the ability to deliver high-speed broadband services such as Internet access, e-mail, secure corporate data applications, and content delivered to mobile devices. Together, CapRock and SeaMobile will employ, at any given time, over a dozen geosynchronous satellites around the globe to provide unique broadband services and applications.

US Coast Guard." Proceeds from the financing round will be used primarily to fund ORBCOMM's next generation satellite program, which will replenish the existing 30 satellites in ORBCOMM's low-earth orbit constellation and upgrade the network's infrastructure over the next few years. These next generation satellites will have unique features and additional capabilities, which will allow ORBCOMM and its partners to offer new products and services. Following the final stages of a competitive bidding process, ORBCOMM expects to sign contracts early in 2006 with vendors who will partner on the first deployment of this satellite replenishment program.

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### WCC Adds Inmarsat to Portfolio

World Communication Center (WCC) added Inmarsat to its satellite Internet and Iridium product lines. They include the Nera WorldPro 1000, which can supply BGAN service. Inmarsat's BGAN service can globally transmit data rapidly at speeds of up to half a megabit per second. BGAN service is currently available in Europe and Africa, with an anticipated global availability in first quarter of 2006.

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### MSC Announces Promotions

Mediterranean Shipping Company (USA) Inc. announced key executive promotions that went into effect January 1, 2006. **Claudio Bozzo** has been named president and COO; **Allen Clifford** will now serve as executive vice president, Commercial; **Robert Milazzo** is promoted to executive vice president, Intermodal and Equipment Control; **Giancarlo Morgera** has been named senior vice president, Liner Services; **Christopher J. Parvin** is now vice president Marine Operations; and **Fabio Catassi** is promoted to president and chief operating officer of Interlink Technologies, the IT subsidiary company of MSC (USA) Inc.

**Nicola Arena** remains with MSC (USA) as its newly named chairman as well as chief executive officer of MSC (USA) Inc. and its subsidiary Interlink.

### Hapag-Lloyd Expands

Hapag-Lloyd is enlarging its globally standardized organization from three to five regions. The management will also be expanded accordingly with the inclusion of CP Ships executives **Juan Manuel Gonzalez**, **Glenn Hards** and **Alan Boylan**, all of whom will become members of the executive body of Hapag-Lloyd Container Line (Excom).

Hapag-Lloyd, based in Hamburg, currently manages its business from three region headquarters: Hamburg (for Europe), Singapore (for Asia and Australasia) and New York (for America). After acquiring CP Ships at the end of last year, Hapag-Lloyd is now setting up two new regions: South Europe, based in Genoa, and Latin America, based in Tampa, Fla.

### Adrion New CEO of CP Ships

The board of CP Ships Limited appointed **Adolf Adrion** new CEO effective January 1, 2006 following the completion of the acquisition of CP Ships by Hapag-Lloyd at the end of 2005. The new CFO will be **Ulrich Kranich**, effective February 1, 2006.

### Del Boca Promoted

Northrop Grumman Corporation appointed **Robert L. Del Boca** as sector vice president and general manager of the company's Defensive Systems Division, effective immediately. Del Boca succeeds **James L. Cameron**, who recently was named corporate vice president and president of the company's new Technical Services sector.

### Devine Joins Healy & Baillie

Healy & Baillie, LLP announced the appointment of **Brian P. Devine** as a partner of the firm effective January 1,

2006. Devine has been an Associate of the firm since 1997.

### OIS Wins Semi Reactivation Contract

In early 2005, Transocean Inc selected Mobile, Alabama based Offshore-Inland Marine & Oilfield Services Inc (OIS) to perform the re-activations of semis Falcon 100 and Amirante. Transocean has now designated OIS as the prime contractor for the re-activation of the Semi C. Kirk Rhein. The ongoing top-side services provided by OIS include steel fabrication and renewals, piping and tubing replacement, electrical repairs, mechanical component replacement and deck crane repairs.

### Samson Makes Changes

Samson promoted **Tony Bon** to COO. **Mark Swiackey** has been promoted to Vice President of Operations. In anticipation of increased opportunities in the domestic and international mooring and tug markets, Samson's Commercial Marine division has made the following changes.

**Larry Unser** has been promoted to Regional Sales Manager. **Craig Kelly** and **Dennis Sherman** have been promoted to Category Sales Managers within the Commercial Marine division. **Robin Collett** has joined the Commercial Marine sales team as Regional Sales Manager.

### Klenck Named VP

Crowley promoted **Joel Klenck** to vice president, ship assist and escort services, a part of Crowley's marine services segment, with overall responsibility for managing the company's growing tug services business from Southern California to Alaska.

### Transas Wins Nav Contract

Transas signed a contract with Turkey's Palmali Shipping, for the procurement of the navigational equipment set for five vessels. The vessels are dry cargo ships planned for construction in Nizhni Novgorod, at Krasnoe Sormovo shipyard.

### USN T-AKE Engines Under Way

Fairbanks Morse Engine shipped three of four engines for ship number three of the Lewis and Clark Class (T-AKE) of dry cargo/ammunition transport ships being constructed at General Dynamics' National Steel and Shipbuilding Company in San Diego. The fourth engine shipped a week later on December 29th. "The build cycle for these FM-MAN 48/60 engines is roughly four engines (one ship set), every six months," said George Ferriter, Program Manager Fairbanks Morse Engine. The

four FM-MAN 48/60 engines provide 35.7 MW for main propulsion and ship service power.

### NASSCO Gets Ninth T-AKE

National Steel and Shipbuilding Co. won a contract option from the U.S. Navy to build an additional ship under the T-AKE program, a new class of combat logistics force ships. The \$317 million contract brings the total number of T-AKE ships awarded to NASSCO to nine, and the total contract value to \$2.8 billion. Options for three additional T-AKE ships remain available under the existing contract.

### Keppel Singmarine Wins Contracts

Keppel Singmarine Pte Ltd. won three newbuilding contracts worth a total \$74 million. The first involves the construction of four AHTS vessels for Hadi Offshore Pte Ltd., a subsidiary of Hadi H. Al Hammam Est., Saudi Arabia (HADI). They will be built at Keppel Nantong Shipyard, with deliveries expected in 2007 and 2008. The second contract is for the construction of a 60-ton Ice-Class AHTS vessel for LUKOIL. Also, Keppel Singmarine will build a 100-ton Anchor Handling Tug (AHT) for a new customer, Seaways International Pte Ltd., a newly setup operations in Singapore.

### Aker Kvaerner Wins Contract

Lundin Netherlands B.V. Succursale de Tunisie awarded Aker Kvaerner a

contract for marine operations in conjunction with deployment of the FPSO Ikdam to the Oudna field offshore Tunisia. The contract value is approximately \$14 million. The work will be executed under an alliance agreement with the Aker Kvaerner company, Aker Marine Contractors, and Maersk Supply Service who will provide the installation vessel.

### Submarine Funds OK'd

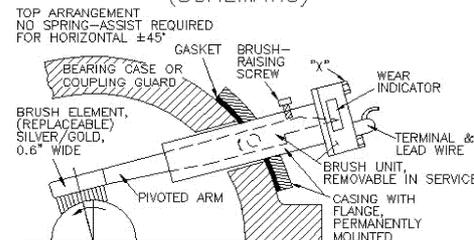
Electric Boat Corp., Groton, Conn., is being awarded a \$1,108,787,793 modification to previously awarded multi-year contract (N00024-03-C-2101) providing full funding for fiscal year 2006 Virginia Class Submarine (SSN 781). Additionally, the modification provides Advance Procurement funding in the amount of \$167,713,000 for fiscal 2007 submarine (SSN 782) and Economic Order Quantity (EOQ) funding in the amount of \$40,076,600 for each of the fiscal 2007 and fiscal 2008 submarines (SSN 782 & 783). Electric Boat Corp. will continue to subcontract with Newport News Shipbuilding and Dry Dock Co., Newport News, Va. The majority of work under this award will be performed in Newport News, Va. (30 percent), Quonset Point, R.I. (15 percent), Groton, Conn. (15 percent), with other efforts performed at various sites throughout the United States (40 percent).

Work is expected to be completed by April 2014.

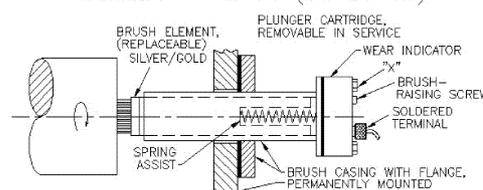
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# Alcohol Testing: The Two-Hour Rule

By Dennis Bryant, Senior Counsel, Holland & Knight LLP

Effective June 20, 2006, persons engaged or employed on board a vessel who are directly involved in a serious marine incident must be tested for alcohol use within two (2) hours of the occurrence of the incident. Most commercial vessels operating in the U.S. territorial sea will have to carry approved alcohol testing devices. These rules will also apply to U.S. vessels worldwide.

For this purpose, "serious marine incident" means any of the following events occurring on a vessel in commercial service:

(a) a marine casualty or accident resulting in:

- (1) one or more deaths;
- (2) an injury that requires professional medical treatment beyond first aid and (in the case of a person employed on a commercial vessel) renders the individual unfit to perform routine vessel duties;
- (3) damage to property in excess of \$100,000; or
- (4) actual or constructive total loss of any vessel subject to inspection or any vessel not subject to inspection that is of 100 gross tons or greater.

(b) a discharge of oil of 10,000 gallons or more into navigable waters of the United States.

(c) A discharge of a reportable quantity of a hazardous substance into navigable waters of the United States or a release of a reportable quantity of a hazardous substance into the environment of the United States.

Any individual engaged or employed on a vessel who is determined to be directly involved in a serious marine incident must provide a blood, breath, saliva, or urine specimen for chemical testing when directed to do so by the marine employer or a law enforcement officer. It should be noted that the test for alcohol use is done with either a breath or a saliva specimen. While theoretically a blood test could be performed for alcohol, blood samples may only be taken by qualified medical personnel, so it is unlikely that such a sample could be obtained within two hours of the incident. Refusal by an individual to provide the specimen is to be noted on the Report of Marine Accident (CG-2692B) and in the vessel's official log book. As soon as practicable, the individual who refuses to provide a specimen is to be removed from duties that directly affect the safe operation of the vessel. Individuals subject to alcohol testing after a serious marine incident are prohibited from consuming alcohol for eight (8) hours following the incident or until after the alcohol testing is completed. While an individual cannot be compelled to provide a specimen, failure to do so may subject the individual to suspension and revocation proceedings and/or a civil penalty.

When the marine employer (e.g., owner, operator) determines that a casualty or incident is, or is likely to

become, a serious marine incident, the marine employer must ensure that appropriate alcohol and drug testing is conducted. Under the new requirement, the alcohol testing must be conducted within two (2) hours of the incident, unless precluded by safety concerns directly related to the incident, in which case the alcohol testing is to be conducted as soon as those concerns have been addressed. Alcohol testing is not required where safety concerns prevent such testing within eight (8) hours of the incident. If alcohol testing is not conducted, the reasons therefor must be explained in the Report of Marine Accident (CG-2692B). It is recommended that the reasons also be entered into the ship's log book. If alcohol tests are conducted by the Coast Guard or other law enforcement agency, the marine employer may rely on those tests if they meet the regulatory requirements. Drug testing must still be conducted within 32 hours of the incident.

The marine employer must ensure that a sufficient number of approved alcohol testing devices are readily available so that the alcohol tests can be accomplished within two (2) hours of the occurrence of the serious marine incident. While the Coast Guard does not require that the alcohol testing devices actually be carried on board, it is difficult to imagine how the owner or operator of an ocean-going ship can comply with this requirement unless the devices are continually carried on board. Even brown-water vessels (nominally minutes from shoreside contact) may have difficulty in obtaining approved alcohol testing devices and administering the tests within two hours. Thus, one should expect that these devices will be routinely carried on almost all commercial ships that operate or anticipate operating in U.S. waters.

The alcohol testing devices must be currently listed on either the "Conforming Products List of Evidential of Evidential Breath Measurement Devices" or the "Conforming Products List of Screening Devices to Measure Alcohol in Bodily Fluids". These lists are maintained by the National Highway Traffic Safety Administration (NHTSA). The first list may be accessed on the Internet at: <http://www.nhtsa.dot.gov/people/injury/alcohol/ebtcp1040714FR.pdf>. The second list may be accessed on the Internet at: <http://a257.g.akamaitech.net/7/257/2422/01jan20051800/edocket.access.gpo.gov/2005/pdf/E5-6848.pdf>

The Coast Guard estimates that breath testing devices cost approximately \$393 each and that the saliva testing devices cost approximately \$97 each. The Coast Guard assumes that 90% of the commercial vessels impacted by the requirement (about 180,000 domestic and foreign) will opt for the less expensive saliva testing devices. The initial cost of equipping all these ships with alcohol testing devices is estimated to be \$40 million and the recurring cost is estimated to be \$18 million annually.

Training costs are assumed to be minimal because

the manufacturers of these devices assert that the tests can be administered by persons without specialized training by following the written instructions. Such an assertion leaves me with a queasy feeling!

Storage of these devices should not present insurmountable difficulty. The devices are relatively small (some approximately the size of credit cards). Acceptable temperatures for storage seem to be in the range between 0° and 104° F. That means the engine room is not a good storage site. The crew living spaces are probably best, but on some ships even these spaces may not be adequate at all times. It is unclear how long these devices may be stored before losing their ability to provide accurate results.

Potential problems with administration of the tests arise in certain situations. Pilots, even though they are employed on the ship, are not directly subject to the control of the marine employer. It might be difficult to prevent a pilot from departing the ship before an alcohol test could be administered. Where the master is directly involved in a serious marine incident, it will be awkward for a crew member to administer the test. On small vessels, the persons involved may be relatives. In some situations, the test may have to be self-administered.

It should be noted that the saliva testing devices only test for the presence of alcohol. They do not test for the amount of alcohol in a person's system. The results of such tests are generally not admissible in court. It is unclear what disciplinary action, if any, can be taken against an individual mariner based solely on the results of a saliva test. The test, though, may help reveal causation of the incident, thus helping reduce the likelihood of similar accidents in the future.

The bottom line is that the ship owner or operator must, in the near future, purchase an appropriate number of alcohol testing devices and place them aboard each ship. Written instructions on when and how to administer the tests and what to do with the results must be prepared and disseminated. Crew members (particularly masters and other officers) must familiarize themselves with the devices. Finally, responsible persons must remember to administer the tests just when all hell has broken loose!



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

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# Acquisition Consolidates Shipbuilding

The first 158,000 gt cruise ships for Royal Caribbean International, MS Freedom of the Seas, is due for delivery from Aker's Turku shipyard in April. Two sister-ships will be delivered in 2007 and 2008.

By Henrik Segercrantz

Only a year ago, Aker Finnyards was reducing staff at its yards, when still suffering from the period of low volumes of cruise ship and the ferry newbuilding orders, which are the main market sectors of the company. Today, the situation has completely changed. Last year the company received 12 newbuilding orders, and has now an orderbook of 16 ships, valued at approximately \$4 billion.

The recent announcement by Aker Yards of the acquisition of French shipbuilder Alstom Marine, including the cruise ship yard Chantiers de l'Atlantique, created diverse reactions in Finland. Aker Yards will own 75 percent of the new company, and Alstom will keep the remaining 25 percent until 2010. Aker Yards will pay \$60.4 million for the 75 percent stake. Depending on the financial performance, the remaining 25 percent will be sold to Aker Yards for up to \$151 million in 2010. An esti-

ated \$423 million will be injected by Alstom into the newly formed company.

Yrjö Julin, president of Aker Finnyards, who also heads the entire Cruise Ships & Ferries sector of the Aker Yards Group, expressed his satisfaction with this move, noting that the market volume in the cruise ship sector of the expanded group will increase to 40 percent, just a little less than the 45 percent share held by the Italian competitor Fincantieri.

The combined French and Finnish builders have produced a number of world class cruise ships through the years, including icons such as SS France, Queen Mary 2, the Voyager class and the Freedom class ships. Aker Yards will be in a position to fully leverage Chantiers de l'Atlantique's large industrial capacity in cruise ships and naval vessels in Saint-Nazaire.

Locally, at the Rauma yard, the existing plans to increase the size of the new-

building dock to suit cruise ships, was put on hold, at least for the time being. Aker Finnyards is currently building three 158,000 gt cruise ships for Royal Caribbean International.

The world's largest Freedom class cruise ship newbuildings, each with a price tag of some \$700 million, are due for delivery from the Turku shipyard in April this year, in spring 2007 and in spring 2008. The hopes for continuing cruise ship construction at the Helsinki yard vanished last year, with the cancellations of the letter of intent from Star Cruises' NCL for a 89,000 gt cruise ship and the cancellation of a luxury residential cruise ship for FS Ocean Club Ltd. Instead, the Helsinki yard, which used to deliver a Panamax cruise ship for Carnival Cruise Lines every nine months throughout much of the 1990's, has now been converted to an assembly and outfitting yard for some of the several ferries Aker Finnyards has in its

orderbook, with steel block production taking place in Turku or Rauma. With the acquisition of the French shipbuilder, there should be good opportunities for utilizing also the know-how of Finnish naval architects in the big-size newbuilding projects anticipated for Carnival Cruise Lines, when the Turku yard has for years been successfully dedicated to competitor Royal Caribbean International.

The RoPax and passenger-car ferry sector has been very active lately. Aker Finnyards is currently building altogether seven ferries and RoPax ships - for Norwegian Color Line, Estonian Tallink, French Brittany Ferries, and Finnish Viking Line.

Most of these include options. In addition the yard is building three container carriers for Swedish B&N Nordsjöfrakt, and the fourth Hamina-class missile boat for the Finnish Navy's Squadron 2000.

## World's Largest Cruise Ship Launched

The first of three ultra-sized cruise vessels for Royal Caribbean Cruises Ltd., Freedom of the Seas, was floated out recently at Aker Yards in Finland. Freedom of the Seas is a floating urban community. There is 16.5 hectares of deck space for, in all, 5,740 passengers and crew. The 158,000-grt ship is 1,112.2 ft. (339 m) long and 126.6 ft. (38.6 m) wide. Ordered in September 2003, the newbuilding will be delivered to Royal Caribbean in April 2006. The second and third vessel in the series will be ready for delivery in spring 2007 and 2008 respectively. The ships in the Freedom class build on the Voyager-class ships, but are 15 percent larger than those, and have new features, all not yet revealed. The Freedom of the Seas takes ship design to the edge and beyond, e.g. with a top-deck aqua environment unparalleled in the industry, featuring three massive pool areas.

### Main particulars:

GRT	158,000
Length	339 m
Breadth	38.6 m
Draft	8.5 m
DWT	10,600 t
Passengers	4,375
Crew	1,365
Classification	+1A1, EO, RP, Passenger Ship, Unrestricted Service, Underwater Survey, TMON, W1
Type of propulsion	Diesel-electric Azipod drive
Main engines	6 x Wärtsilä 12V46C, total output 75,600 kW
Propulsion	3 x Azipod, total output 42,000 kW
Bow thrusters	4 x 3,300 kW
Speed	21.6 knots
Steel Plate for Hull	340,000 sq. m.
Weld seams	1,630 km
Paint	420,000 liters
Cable	3,500 km
Pipes	160 km
Windows	5,800 sq. m.

## QM 2 Pod Damaged

The Queen Mary 2 was headed out to sea last month when the ship returned to Port Everglades after a problem was discovered with a motor, according to local press reports.

According to the Miami Herald, the cruise ship hit a sea wall, damaging part of its propulsion system.

Shortly after the ship's 1 p.m. departure from Port Everglades, a bridge instrument indicated there was a problem with one of four propulsion motors. The captain called the U.S. Coast Guard more than three hours later and said there was reason to believe the ship hit a submerged object when it was about five miles out. About 10 p.m., tugboats pulled the ship back to the port, where the vessel remained for two days.

The ship was able to continue its 38-night South American odyssey, originating in New York and ending in Los

Angeles. However, enroute there were reports of many disgruntled passengers, unhappy that the ship was forced to altogether skip many ports of call to make up for lost time. The ship's damaged pod is expected to be repaired after it finished its current cruise in late February in Los Angeles.

## First Choice Sells Ships, Completes INTRAV Buy

First Choice Holidays PLC has sold two coastal cruising ships to Cruise West, a U.S.-based, family owned small-ship cruise line, for \$16.7 million. The two ships were among the four cruise

ships acquired as part of First Choice's purchase of U.S.-based leisure travel group INTRAV, the acquisition of which the company has completed. The net consideration for the purchase of INTRAV, including the sale of the two ships, is \$46.8 million.



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## Carnival Expands With Fincantieri

Carnival Corporation late last year reached an agreement with Fincantieri for the construction of four new cruise ships worth more than \$2 billion, one each for Holland America Line, Carnival Cruise Lines, Princess Cruises and Costa Crociere, along with options for two additional vessels, one each for Carnival Cruise Lines and Holland America Line. The four new ships will add a collective 11,756 lower berths to the cruise operator's fleet. According to Carnival Corporation & plc Chairman and CEO Micky Arison, "Fincantieri constructs some of the world's most beautiful and technically advanced ships and this agreement enables us to expand our core North American and European brands at very competitive prices considering today's unfavorable U.S. dollar/euro ratio," he said. The new ships and options include:

- An 86,000-ton, 2,044-passenger, \$450-million ship which will be the largest ever constructed for Holland America Line. It will be built at Fincantieri's Marghera shipyard and is expected to enter service in summer 2008. There is also an option for a sister ship scheduled to debut in spring 2010.
- A 3,100-passenger ship for Princess Cruises, a sister to the 116,000-ton Emerald Princess, will be built at Fincantieri's Monfalcone shipyard for \$570 million and will debut in fall 2008.
- A 130,000-ton, 3,608-passenger cruise ship for Carnival Cruise Lines - representing the largest vessel ever constructed for the operator - will be built at Fincantieri's Monfalcone shipyard at an estimated all-in cost of \$680 million, and is expected to enter service in fall 2009. There is also an option for a sister ship.
- A 3,004-passenger ship for Genoa, Italy-based Costa Crociere expected to debut in summer 2009. A sister ship to the Costa Concordia, the 112,000-ton vessel will have an estimated all-in cost of \$589 million and will be built at Fincantieri's Sestri shipyard.

Carnival Corporation's orderbook now includes 16 new ships, 13 of which are being constructed by Fincantieri.

## New Condo Venture Seeks to Set Sail?

Even as the housing market continues to cool in the United States, approaching the mythical popping of the "housing bubble," a Florida company - Condo Cruise Lines - is suggesting that cruise ships could serve as the new vogue in waterfront property ownership.

"With nearly eighty million baby boomers starting to retire this year, and a large number of them wanting to live where it's warm, someone needed to come up with a solution, so I thought of assembling a group of investors to purchase a cruise ship and convert the cabins to condominiums," Pensacola native Mark Boyd said.

Boyd reportedly has developed a formula to produce the typical \$15 million annually it takes to operate a mid-size luxury cruise ship. As a result, the condo owners will only pay a standard condo fee of between \$7,000 to \$10,000 per year for a suite costing from \$349,000 to \$529,000. Boyd won't divulge the formula, but says a portion of the fee is derived from the ongoing casino and nightclub operations on the ship.

The plan? "We will take a retired cruise ship and convert every two to three cabins into luxury suites and sell them to investors," Boyd said.

"Our condo suites will rent from \$3,000 a week for our basic single-suite, to \$6,000 a week for our largest three-room penthouse suite, thus making luxury cruising a little more affordable, while at the same time providing a tremendous return on our condo owners' investments," said Thomas Blackburn, Boyd's partner and Executive Vice President. Condo Cruise' first ship is already being reserved by prospective condo purchasers in the same manner a real estate condo development sells its units pre-construction. The reservation process requires the purchaser to provide a \$10,000 deposit that is refundable with interest for any reason by either the purchaser or Condo Cruise Lines.

## AIDA Celebrates Record Year

AIDA Cruises achieved an exceptional increase in its annual results for the business year 2005. With a turnover of \$455.8 million and a total of 233,000 passengers, AIDA Cruises has had its most successful year since the company was founded. AIDA Cruises has initiated a number of major investment projects during the last financial year with, for example, three new AIDA vessels being built at the Meyer Shipyard in Papenburg at a cost of \$1.1 billion. The steelwork has already commenced in October of this year and the first ship will be laid down in March 2006. The new AIDA vessels will be delivered in the spring of 2007, 2008 and 2009, ensuring an 80 percent expansion in the capacity of the AIDA fleet by the year 2009.

## Schat-Harding Wins Contract

Schat-Harding, won a contract to supply lifeboats, tenders and davits for a cruise ship order to be placed at France's Chantiers de l'Atlantique yard. Schat-Harding will supply six CTL38 tenders, 20 MPC32 150 person lifeboats and 2 MCB24 combined life / rescue boats and davits to the two vessels, ordered by MSC Cruises. The 1093 ft. (333 m) long vessels will carry 3,887 passengers and more than 1,300 crew members. The first ship will be delivered in spring 2008 and the second in spring 2009.

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## Bayonne Dry Dock Reports Strong Year

Bayonne Dry Dock & Repair in Bayonne New Jersey recorded a busy 2005, with business prospects looking good for the coming year as well. According to a company spokesman, the company noted an upswing in Navy business in 2005, which included the drydocking of the USNS Shughart (T-AKR), a Large, Medium-speed, Roll-on/Roll-off Ships, or LMSR. The 900-ft. ship entered the shipyard in July and was out a month later in August 2005. The main focus of the work included ultra high pressure water blasting and painting, and encompasses mechanical work as well. The company received a second contract for this type of ship, and was expecting the USNS Mendonca (T-AKR 303) to arrive on a 45-day stay on February 12. Work to this ship — which was christened in 1999 at Avondale in New Orleans — includes modifications to its main engine propulsion exhaust system. In addition to the above work, the shipyard reports vibrant activity in repair and topside work on a variety of commercial ships, barges and tugs

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## New Machinery Space Fire Protection

Marioff's offers a new machinery space flooding total fire protection system dubbed HI-FOG MT4. With the system, the company claims there is no need to evacuate personnel, seal the space or shut off the ventilation. By immediate activation, the fire is contained and extinguished in its infancy and the damage can be minimized. HI-FOG MT4 is touted as an alternative to traditional fire fighting systems and has passed the latest IMO fire test requirements, as defined in MSC/Circ. 1165, adopted in May 2005.

The key feature of HI-FOG MT4 is that it can be activated the second a fire is detected. The extinguishing media is plain, fresh water in the form of water mist, so an activation will not result in equipment corrosion. No foam or chemicals are used, so the system does not present any harm to people in the space. The system can be full scale tested regularly to ensure that it is always in working condition and to demonstrate its operation to the crew. Finally, there is no need to divert to a port for recharging the system, as the system uses a pump unit rather than compressed gas. The system has been designed to provide both total flooding and local application (IMO MSC/Circ. 913), using the same pump unit, tubing and spray heads. Using one integrated system saves on component, installation, maintenance as well as training costs. HI-FOG also is an efficient fire extinguishment system. It has proven itself in actual ship fires, which typically have been extinguished in about a minute from the moment the fire started.

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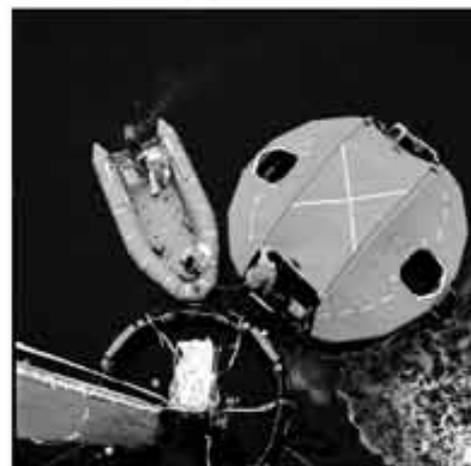
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# Propelling W&O Supply to New Heights

By Greg Trauthwein

When David Turner, 42, started his career in the marine industry 15 years ago with W&O Supply, he was not your typical "marine guy" by any stretch of the imagination. Asked to lunch by company founder Herb Goelz, whom Turner had formed a relationship with in his position as a commercial bank manager, he was at an early career crossroads and was unsure of his future course. "Banks are big, and it's hard to have a tangible impact every day," Turner said. "Herb asked me if I wanted to move to Mobile and run a branch, and I asked two questions: 'What does a branch manager do?,' and 'Where is Mobile?'"

Upon driving to Mobile to check it out, Turner found a 2,000 sq. ft. warehouse with three employees, and a branch that generated \$80,000 a month and was losing money. He accepted the job - the first outside manager ever hired by the company - mainly on faith in Goelz, and he moved to Mobile. Within a year the branch was generating \$250,000 a month and was making money. "I trusted Herb," Turner said.

While Turner's engineering expertise was scant, his salesmanship, energy and drive compensated as he learned the

business. Hailing from Pittsburgh and four generations of steelworkers, he seemingly has melded the blue-collar roots with business savvy to good result.

At the time he took over in Mobile, W&O's reputation was less than stellar, and the move initiated a process that changed the way in which the company looked at business. In essence, they found, you need a "CEO of each branch;" one person with total responsibility, from top down.

Today the company has 13 branches across the country, with Turner serving as CEO since 2003. The company has grown from a turnover from \$20 million to \$76 million, and W&O Supply is coming off of 2005 as its best year in the history of the company, with the highest sales volume ever, according to Turner.

## Growth

With 13 branches and a wide range of engineered products and systems, W&O Supply has found success in the oft-turbulent marine business. The secret is actually not a secret at all, as the company is like a well managed stock portfolio: diverse enough to smooth wild market segment swings while reactive enough — and well financed by Dutch-

based parent Pon Holdings — to jump on opportunities when they present themselves.

A significant step in the ascension of W&O Supply was breaking the mold of simply being — and just as importantly, being perceived as — a supplier of product.

The company offers an array of engineered products, delivered assembled, tested and ready to install to shipyards that are increasingly pressed to move materials from storage to vessel as quickly as possible.

A banner in this transition was the company's acquisition of the automated valve line from Valve Automated Controls (VAC), which has led to several breakthrough contracts. Most recently, W&O and VAC were tapped to supply the automated valves for the eight new National Security Cutters (NSCs) and also seven Offshore Patrol Cutters (OPCs), part of the U.S. Coast Guard's Deepwater recapitalization program. The contract calls for W&O to supply more than 150 automated valves for each of the 15 vessels over several years.

Upon touring the Jacksonville warehouse, there is indeed a lot of pipe and valves, but W&O Supply also offers a wide range of engineered products, such as RISE, Sea press and the Asco line of solenoid valve. The Asco line, acquired two years ago nationwide, has been particularly successful, and W&O's sale of the line tripled last year, Turner said.



David Turner

ASCO is a leader in the design and manufacturing of solenoid valves. In 1910, ASCO became the first company to develop and manufacture an electrically operated control device known as the solenoid valve. ASCO has served the Navy for over 65 years. ASCO continued its development activity in these product areas and today manufactures products designed to control and monitor the flow of air, gas, water, oil and steam.

"They owned the market 30 years ago, but as they grew, they focused on other growth areas (other than the marine business)," Turner said.

While the company is continually on the prowl for new systems, it relies on products such as the SPACE cast steel valve line as a steady performer.

## W&O Supply: Stepping Up After Disaster Strikes

W&O Supply CEO David Turner was standing in his local deli waiting for a sandwich when he saw television news footage of one of the New Orleans levee breaks the day after Hurricane Katrina, and thoughts immediately turned to the 11 employees of the W&O Supply New Orleans branch. "We have 11 people in New Orleans, and it took us 10 days to find all of them to ensure they were safe," Turner said. "Through all this personal suffering, our employees have somehow managed to stay focused on what customers we did have operational. Within two days of the storm, we had sales people operating remotely with laptops from their locations and shipping products to customers from other W&O locations around the U.S." But this is not a story solely about the seamless continuation of business and the saving of dollars in the face of disaster, rather a glimpse of a company that cares for the human needs of its employees first. The day after the storm, the chairman of Pon (W&O Supply's Dutch owner, a \$5 billion privately held company) was on the phone, not asking about our business plan, but to ask about the status of our 11 people, Turner remembered. "He wanted daily updates on the status our people, not sales figures." While the level of devastation to the entire region grew exponentially, Turner and staff focused on the needs and livelihoods of its 11. Employees across the country donated generously via an employee fund, and corporate matched dollar for dollar contributions made by employees.

We knew we had to do something, and we knew we couldn't help everyone (in the region) ... so we focused on helping our 11 the best we could, Turner said.

W&O Supply has had great success with the ASCO line, a designer and manufacturer of solenoid valves.





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## Profile

With sole source contracts with barge building giants Trinity and Jeffboat, Turner estimates that the Space valve owns nearly 80 percent of the domestic barge market. Turner counts finding good quality people as one of the biggest challenges in growing the company today, and to this end fulfilling the

need is a top focus in 2006. The company has initiated a new management training program, and has hired a new Director of Human Resources to enact the plan to "grow our own managers." Specifically, the company plans to hire entry level management candidates, put them through an eight to 12-month man-

agement program and then dispatch them to the field to run one of the company's 13 branches.

### Lean & Mean

A major milestone for W&O Supply in 2006 will be the implementation of the LEAN management process.

**"Herb asked me if I wanted to move to Mobile and run a branch, and I asked two questions: 'What does a branch manager do?,' and 'Where is Mobile?'"**  
**— David Turner**

The decision was made to adopt LEAN when its one of its biggest clients, Bath Iron Works, decided to adopt the process, and in turn came to W&O Supply, one of Bath's major suppliers, with the plan.

"We have 42,000 SKUs, and this will help us to determine more effective and efficient inventory management and control," Turner said. Consultants from Logistics Resources International in Atlanta have been working with W&O supply employees to help identify and eliminate "non-value added" processes. Turner expects that the company will be able to achieve multiple money saving and efficiency enhancing ends simultaneously, such as determining the cost of obsolescence, more accurately determining the cost of transportation, and to provide more targeted and valuable sales information regarding percentage of sales from each product line.

"It really evaluates both sides of the ledger, and looks at the entire process from the time the order is received until the product/system is delivered," Turner said. "In the end, this will help to create a more efficient W&O Supply."

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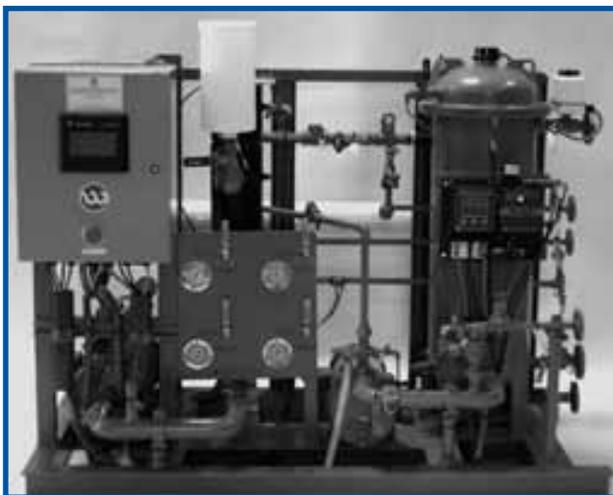


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## Outlook for 2006

W&O Supply counts Government and Government-related business, and the commercial marine business as nearly equal partners accounting for approximately 80% of its annual sales.

In evaluating the coming year, Turner counts a strong backlog and the prospects of a much-improved U.S. Navy repair business as good signs for 2006.

To augment its traditional areas of strength, the company plans a strong push into the booming offshore market, bringing with it marine-proven copper-nickel pipe, SPACE valves, metric valves and a plethora of automation systems.

# New Ballast Water Management System from Greenship

Ships move more than 80 percent of the world's commodities, and in the process transfer approximately 3 to 5 billion tons of ballast water worldwide each year. The issue of aquatic invasive species, including the transfer of harmful organisms in ships' ballast water and sediments, is seen as one of the four greatest threats to global marine biodiversity and ecosystems, and as a significant threat to coastal economies and even public health.

Greenship recently introduced a new shipboard Ballastwater Management System, a system designed to suit ships best that have ballast flow rates from 50 to 5,000 cu. m./hr.

Greenship's Ballast Water Management System includes:

- The Sedimentor, for removing sediment and biota during intake.
- The electrolyze system for extermination of bacteria and organisms.



The Sedimentor

## The Sediment Removal System

Greenship designed its sediment prevention system to not only fight pollution of the ballast water, but to also help prevent the cause of the consolidating mud-problem. Tons of extra sediment in the ballast tanks makes a ship less fuel efficient and allows the carriage of less cargo. According to the manufacturer, the Sedimentor removes 100 percent of >20 micron and 80 percent of > 10 micron sediment particles. The remaining sediment particles stay in suspension and will leave the ballast tanks during de-ballasting.

The Sedimentor is engineered from modular parts, providing maximum flexibility in construction and space. There are two volumes: A 50 cu. m./hr. volume and a 100 cu. m./hr. volume.

The Sedimentor can be easily integrated into existing ballast systems, and the modules are measured for easy access into the engine room.

## Electrolyze System

Greenship's electrolyze system can be used for dis-infection of water without

using any chemical treatment. Greenship's in-line disinfecting technique is designed to be implemented in a wide range of applications. Using the present ions and salts in the water, the electrolytic cell produces Sodium-hypochlorite. After dosing the Sodium-

hypochlorite in the water returns to its original structure. This way there are no negative effects for the environment.

The electrolyze system for extermination of bacteria and organisms, with a killing rate 100 percent, the manufacturer claims.

The electrolyze system is designed to fit easily into existing ballast systems

The electrolyze system is designed to be easily integrated into existing ballast systems, while needing to be cleaned only once per year.

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## Clean Water Tech

### EcoStream Bilge Water Treatment System

Alfa Laval's EcoStream Bilge Water Treatment Systems has been approved by IMO for compliance with IMO requirements (IMO Resolution MEPC

104 79) that took effect as of January 1, 2005. As of this date, all bilge water pumped overboard from all new builds and retrofits on existing ships must meet previous standards for an oil content under 15 ppm and also fulfill new stan-

dards for contaminants in the form of emulsions of oils, chemicals, detergents and other particles.

EcoStream has also been submitted for certification by the US Coast Guard.

The EcoStream System is intended for

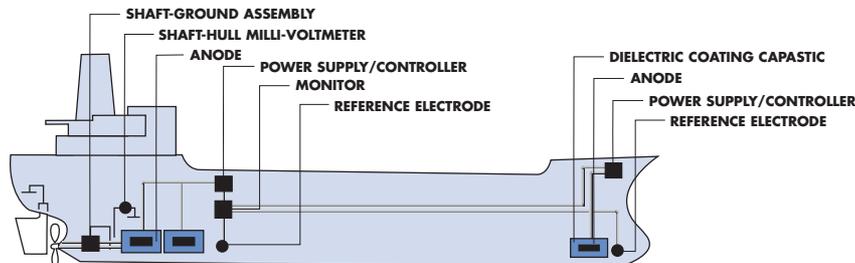


installation onboard ships or other marine units to reduce the oil content in the bilge water to less than 15 ppm. In the EcoStream System, untreated bilge water is filtered, preheated and fed to the cleaning module by a feed pump. An oil-in-water-monitor on the clean water outlet is set to the required value. When the oil content is below the acceptable value, the clean bilge water goes to the clean bilge tank or is discharged overboard. If the value is too high, it is returned to the bilge water feed tank.

EcoStream can reportedly treat bilge water to well below IMO standards, but tough emulsions may require a further treatment phase. Although EcoStream is designed to operate without chemicals and does not include a dosing unit as standard, feed conditioning chemicals can be added before the feed pump.

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### New Lint Removal System for HAL



Air Dynamics Industrial Systems Corporation designs and manufactures pollution control equipment for shipboard operations. Lint Removal Systems (LRS) for main and crew laundries in addition to high efficiency Galley Hoods for galley areas.

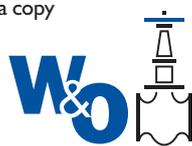
Subsequent to a major cruise ship fire in 1998, Air Dynamics Industrial Systems Corp designed and built a system to aid in preventing similar incidents. Since the design and development of this system, the company has retrofitted, fleet-wide the Holland America Line (HAL) with LRS systems. Each vessel's system is custom designed to fit all space constraints for operator access and maintenance.

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## BalPure Ballast Water Treatment System

Severn Trent De Nora introduced the BalPure ballast water treatment system, a patent-pending system that generates biocides, meters and analyzes the residual level of both biocides and neutralizing agents and logs the performance of the overall ballast water treatment system. Third party testing of the BalPure system reportedly confirmed effluent quality that meets proposed IMO ballast water standards. Through the oxidation of the halide ions in seawater, the proprietary BalPure electrolyzer generates oxidants that are injected into the ballast stream where they react with both inorganic and organic matter, as well as bacteria, to provide effective disinfection. As the organisms are inactivated or destroyed, the oxidant concentration in the ballast water is reduced. The BalPure system then introduces a neutralizing agent to the ballast water, where it reacts with residual oxidant, rendering the water safe to discharge into waterways.

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## OSG Gets LR Notation

OSG Ship Management was awarded Lloyd's Register's Ballast Water Management Plan (BWMP) notation for its managed fleet of 32 product tankers and chemical carriers. OSG Ship Management Ltd. is reportedly the first tanker operator in the world to have achieved the Lloyd's Register notation for its entire fleet.

## Ensolve Wins Navy Deal

EnSolve Biosystems won a Small Business Innovative Research (SBIR) contract by the U.S. Navy to develop a prototype Portable Oil Remediation System (PORS) for removal of hydrocarbons, organic contaminants, and trace metals normally found on inactive vessels. EnSolve will design, build and test a prototype system that can be used to clean the wash water to regulatory acceptable levels required for overboard effluent discharge. The system will be based on EnSolve's patented biotechnology process, which uses naturally occurring microbes to consume oil, grease, fuels and other hydrocarbon-based wastes.

## Ultra-Sep Finds Success

Designed and manufactured by Coffin World Water Systems (CWWS), Ultra-Sep Bilge Water Separators were the first systems in the world certified by the United States Coast Guard (USCG)

to the standards of IMO's new resolution MEPC.107(49). USCG certificates of approval issued to all eight available Ultra-Sep models.

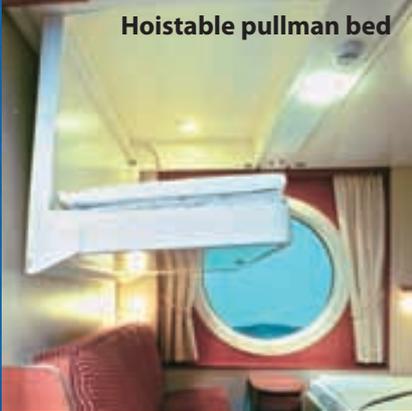
Some Ultra-Sep advantages include:

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first achieved by any manufacturer

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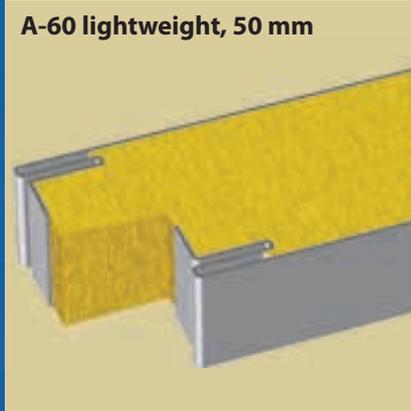
- No chemical or biological sludge
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# Finnish Maritime Industry Shows Strength

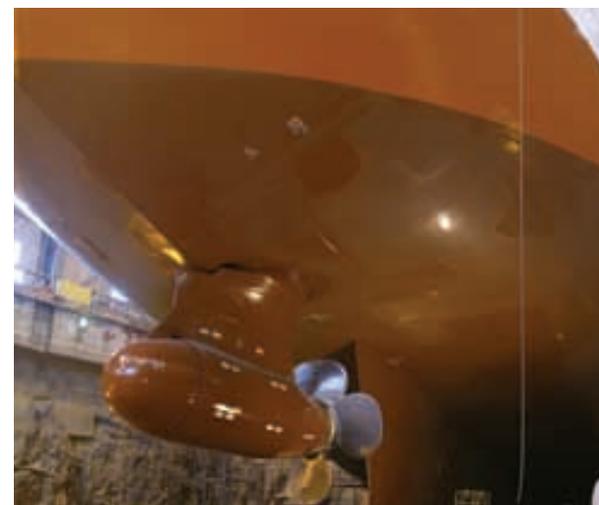
By Henrik Segercrantz

The Finnish economy has developed very well over the recent years. The three percent annual GDP growth that this Nordic country has experienced over the last few years is a good achievement, when compared to the figures for the euro zone. As a measure of the development of the industry, the OMX Helsinki stock exchange index has strengthened by 35 percent in one year, and Finland was last fall, for a third consecutive year, ranked the most competitive economy in the world by the World Economic Forum, with the U.S. ranked second. With a population of some 5.2 million people, Finland has a relatively big maritime industry, and has shown record sales figures and increasing orderbooks during the past year. Both the shipbuilding industry, with the three newbuilding yards of Aker Finnyards, and the offshore construction sector, with Technip Offshore Finland, have recently shown strong performance and have gained a good order backlog. Record orderbooks have been gained also by diesel engine manufacturer Wärtsilä, as well as by ABB for its electric azimuthing Azipod thrusters, alternators and equipment, and a number of other Finland-based

internationally operating marine equipment suppliers.

## Norilskiy Nickel: A Double-acting Arctic Containership

An interesting recent newbuild is the Arctic containership for Russian mining company MMC Norilsk Nickel, which just left the Helsinki shipyard. Norilskiy Nickel is intended for transporting nickel from the river port of Dudinka at the Yenisey to the open water port of Murmansk at the Barents Sea in North-western Russia. The containership is fitted with covered cargo holds and also a tween deck to allow a variety kind of return cargoes to be transported, from wheel cargoes, containers and even bulk cargo. The 14,500 dwt vessel has diesel-electric machinery, and is fitted with one 13 MW azimuthing electric Azipod-drive. This will be the first cargo ship newbuilding designed to the double-acting ship principle, to break heavy ice by going astern, a patented solution held by Finnish Aker Arctic Technology Inc. The wheelhouse, with its navigation equipment, supplied by Kelvin Hughes, is thus doubled. The ship's Damatic/Valmarin-type machinery control and monitoring system is supplied by L-3



Designed by Aker Arctic Technology, assembled in Helsinki with the hull from German Aker Ostsee, Norilskiy Nickel is the first double-acting cargo vessel newbuilding for Arctic operation. The ship is fitted with two 13 MW Azipod units supplied by ABB.

Communications Corporation. The performance of the ship will be followed with keen interest, as several Arctic tankers are under construction and being designed for operation in the Russian Arctic. MMC Norilsk Nickel, the world's largest producer of nickel and palladium and one of the largest producers of platinum, intends to expand its own fleet of this type, in order to decrease its sea transportation costs. The company has announced its intentions to build five such vessels, an investment amounting to EUR 450 million, in 2008. Until now, the transportation has been carried out by Murmansk Shipping Company, who also handles the expensive icebreaker services in the region.

## New Ice Model Basin

Aker Arctic Technology Inc. (AARC), the predecessor of which was the yard-owned Arctic Research Center (MARC), has built a brand new ice model basin in the area of the new big Vuosaari cargo port which is under construction east of Helsinki. The company, owned by Aker Finnyards with minority positions held by Wärtsilä, ABB and Aker Kvaerner Engineering and Technology, was established a year ago to independently offer its Arctic expertise services to clients operating or planning operations of ships or structures in the Arctic. The new ice model basin, 300 ft. x 26.2 ft.

Three 70,000 dwt Arctic tankers have been ordered for transporting oil for a joint venture between Lukoil and ConocoPhillips. The design is done by Aker Arctic Technology together with builder Samsung, and ABB will supply the twin 10 MW Azipod drives.



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x 7.2 ft. (70 m x 8 m x 2.2 m) is wider than the previous to better allow maneuvering tests of, for example, ships docking with Arctic offshore caissons.

Recent projects designed by AARC include the FESCO Sakhalin icebreaking supply and stand-by vessel and the containership Norilskiy Nickel. The USCG Great Lakes Icebreaker Mackinaw is currently in the ice trial phase. This icebreaker is also designed to AARC's double-acting principle, and is fitted with two electric Azipod drives. AARC provided consulting icebreaking design services including performance evaluations through extensive ice model tests. AARC is currently active with its recent design contracts and licenses for 70,000 dwt Arctic tankers under construction both at Korean shipbuilder Samsung Heavy Industries as well as for Russian Admiralty Shipyards. The three Samsung tankers are intended for exporting oil produced by a joint venture between Russian Lukoil and U.S. ConocoPhillips from the Varandei terminal in the Barents Sea. The ships will be built to ABS class except for the hull, which is built to Russian ice class LU 6. The two tankers being designed by AARC together with the Admiralty Shipyards are intended for the Prirazlomnoye offshore oil field in the eastern Barents Sea, which now is being developed. The oil shipping agreements for both projects will be handled by Russian Sovcomflot.

Potential future Arctic projects for AARC are related to Arctic LNG transportations, new activities in the Yamal area, the offshore developments around the Sakhalin Island and through the new activities in the Caspian Sea.

#### SPAR-Rigs: Standing Strong Against Hurricanes

The offshore fabrication yard Technip

Offshore Finland, on the west coast, has for several years successfully designed and built truss spar-type deep-water drilling platform hulls for the major oil companies operating in the Mexican Gulf. Current production includes a contract for engineering, procurement and construction of the spar hull and mooring systems for Chevron's deepwater Tahiti Field Development Project in the Gulf of Mexico. The hull, with a length of about 557 ft. (170 m), a diameter of 128 ft. (39 m), and a steel weight of approximately 24,000 tons, will be completed in spring 2007 after which it will be transported by a heavy transport vessel to the Gulf of Mexico, floated into vertical position, moored to the seabed, after which the topside modules, also fabricated by Technip, will be installed. The Tahiti field lies in 4,000 ft. of water and is one of the U.S. Gulf's largest deep-water discoveries. The previous delivery of a spar rig was the 554 ft. (169 m) long, 98 ft. (30 m) diameter

Constitution hull for Kerr-McGee Oil & Gas Corporation. To date, altogether ten spar rig hulls have been delivered by Technip Offshore Finland for this area, which all seem to have sustained well without any major damage in the 20-30 m waves from the hurricanes that swept over the Mexican Gulf last fall.

#### Wärtsilä Looks East

In line with the shipbuilding orders placed in the world, Wärtsilä Corporation has shown record figures in recent reports. The company recently noted, however, that due to full order-books at the yards, new orders for large ships have declined. The offshore exploration segment has compensated for that, with up to a third of the order intake of medium-speed engines coming from this sector in Q3 2005. The order-book of Wärtsilä's Ship Power Business increased in that period by 96.3 percent to approximately \$1.75 billion, compared to that of the year before, and net

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sales for the first nine months of the year increased to approximately \$540 million. In recent years, the company has strategically focused on its target areas for growth, by establishing factories for propeller manufacturing and tunnel thruster manufacturing in China, and is currently setting up a factory for diesel generating sets in China. In India, the company is setting up a plant for manufacturing marine reduction gears. The company strongly focuses on expanding its Service business where it has shown double-figure sales growth rates. A recent deal was the acquisition of Deutz marine engine service business.



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# Finnish Hand in Brazilian Revival

By David Tinsley, technical editor



The first RTflex-50 two-stroke engine installed in China is a six-cylinder 9,720 kW engine for Rederi AB Donsötank's 19,500 dwt geared bulk carrier MS Credo. Built at Shanghai Edward Shipbuilding Company, the technically interesting vessel has a directly coupled Lips CPP propeller, a 2,000 kW shaft alternator, but no frequency cyclo converter. It is built to Finnish-Swedish ice class 1A Super.

In its two-stroke engine segment Wärtsilä recently entered into a strategic alliance with Mitsubishi Heavy Industries. The companies developed together the successful RT-flex50 engine, of which some 40 engines are in the orderbooks, with recent pioneering orders from India and China. The first engines of this type to be manufactured in China, a pair of seven-cylinder engines for two 52,000 dwt ice class tankers for Swedish Rederi AB Gotland, are being manufactured by Dalian Marine Diesel Works.

Last fall Wärtsilä announced that it has developed a new version of the RT-flex engine, the RT-flex82 engine, with a cylinder bore of 820 mm. The new engine comes in two stroke lengths, 2,646 mm and 3,375 mm. The shorter stroke version, the RT-flex82C, is available in six to 12 cylinder versions, and is intended for Panamax size container-ships up to 4,500 TEU with a typical speed of 24 knots. The longer stroke version RT-flex82T, which comes in a range from six to nine cylinders, is aimed at the VLCC and ULCC tanker market. These engines are fitted with common-rail technology. There are also otherwise identical engine available, but with traditional mechanically driven camshafts with fuel injection pumps etc, branded RTA82C and RTA82T.

The company reports several new orders of its newest medium-speed engine, the Wärtsilä 46F with common rail fuel injection as standard, and reports an impressive increase in its market share for medium-speed main engines, to 41 percent from 25 percent a year before. More than 50 Wärtsilä 50DF dual-fuel engines have been ordered for some 13 LNG carrier new-buildings. One major order received last year was from Samsung to power a series of six 155,000 cu. m. LNG carriers.

Business verve is the vital accompaniment to technological expertise, product quality, efficient production and high-grade technical support in order for a propulsion systems supplier to be truly competitive in today's market. Finland's Wärtsilä Corporation has recently given new expression to its circum-spect commercial approach by putting down an important building block in South America. While the extension of licensee networks involving the leading engine designers has tended to focus on eastern Asia, and China most notably, in recent years, Wärtsilä has now added a Brazilian dimension to the sourcing of large, two-stroke diesels of the latest generation. Wärtsilä's recently signed agreement with Nuclebras Equipamentos Pesados (Nuclep), based at Itaguai, Rio de Janeiro, may be seen against the backcloth of the decision by the Brazilian Government to reinvest in the rehabilitation of the national shipbuilding industry, and in the light of the considerable tanker fleet development program planned by Petrobras. The political will evidently exists not only to revive ship construction to meet the long-term needs and opportunities presented by the booming Brazilian economy and its growing export performance, but also to put shipbuilding on a footing where it can compete internationally. Wärtsilä's acknowledgement of Brazil's requirement for state-of-the-art technology is implicit in the pact whereby Nuclep has been granted the right to manufacture certain types of Wärtsilä's electronically-controlled, common rail, two-stroke marine diesels. Sulzer RT-flex models in the 500- to 680-mm bore sizes will be produced by the state-owned Brazilian company. The first delivery of a Wärtsilä engine from the Itaguai plant is scheduled for the beginning of 2008, and targeted annual output is in the range of 6-10 engines. Transpetro, the logistics arm of Petrobras, is looking to order a total of 42 tankers for delivery up to 2015, with more than half that number constituting the first phase of investment focused on newbuild com-

pletions by 2010. Brazilian construction is required for all the projected tonnage, and the potential spin-off for the allied sectors rests in the reported stipulation of a 60 percent national content. Marine engines have not been manufactured in Brazil since 1996, such that the Nuclep pact with Wärtsilä is a significant event in the restoration of an industry and in the development of local sourcing capabilities salient to national newbuild content rules. The opening stage in the Transpetro program would encompass Suezmax, Aframax and Panamax crude carriers, 40,000-dwt products tankers and a series of LPG carriers. Products tankers would figure more prominently in the subsequent round of investment, in line with the Petrobras strategy of moving from the goal of self-sufficiency to becoming a key exporter of oil products. Seven shipyards have been prequalified for Transpetro's tender covering the initial tranche of newbuilds. Four of the yards involved are said to require thorough modernization, while the three others have yet to be built. One of the so-called "virtual yards", which would rank as the largest in the southern hemisphere, is to be created in Pernambuco by a consortium drawing together the Brazilian companies Camargo Correa and Andrade Gutierrez with Mitsui of Japan. Shipbuilders from South Korea, Japan, China, Singapore and Norway are seeking a stake in Brazil's revamped and enlarged shipbuilding industry. Nuclep supplies heavy engineering equipment to the nuclear, power generation, marine and offshore industries, and has ample heavy craneage, fabrication, and welding facilities to underpin future marine engine production. However, certain investments will be needed, and it will acquire technical assistance and training of personnel as well as marketing and production support from Wärtsilä. The Finnish group created a subsidiary in Brazil 15 years ago to provide back-up to the shipping and offshore sectors as well as to Brazilian yards, and recent years have also seen the development of business in the supply of machinery for stationary power generation plant.

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Circle 207 on Reader Service Card

# David A. Slager, Chairman of the Board and CEO, Radio Holland

Radio Holland Group in the Netherlands, a maritime electronics supplier and service organization, faces many of the same challenges of other sales and service organizations: fierce competition; maintenance of a global network of technicians; and an ever-evolving clientele. Nearly four years after its management buyout, the company is prosperous and expanding. **David A. Slager**, Chairman of the Board and CEO, spent some time with MR/EN to explain his company's success. — by *Greg Trauthwein*

David A. Slager



**MR: How would you describe your management philosophy?**

**Slager:** I am a strong believer in direct contact with as many employees as possible, which is why I travel around the world so much. It helps to keep me aware of what's going on, and gives me the opportunity to motivate. For example, when I joined Radio Holland Netherlands, the company was losing money, and we needed to re-organize. I set up "social meetings," which included small groups (about 15) of staff together to discuss the plans for change.

Using this strategy, the plan became "our" plan, not "my" plan. Whenever we want to make changes, I discuss it with the staff before implementing.

**MR: What are some of the most significant recent industry changes?**

**Slager:**

1. IMO regulations as driver of equipment on ships.
2. Far East Shipbuilding activities, have grown enormously, which have allowed us to grow our business, particularly in China
3. The tightening of safety regulations in the wake of September 11, which has significantly broadened our product range.
4. Customers have become more interested in the "one stop shop" principle. Though I do not like this overused and misused term, it best sums it up.
5. On the customer side, mergers have taken place on a grand scale in the last few years, which has turned out to be very positive for us. I believe consolidation of competitors will continue, as well. The main problem for smaller companies is the rising cost of Research and Development (R&D), as it is increasingly difficult for these manufacturers to keep up and survive. This consolidation is not a problem for us, as we are representing most of the major maritime electronics manufacturers around the world.

**MR: What investment is Radio Holland making today that are intended for the long-term good?**

**Slager:** We continuously look at our network (which currently encompasses 54 branches and 775 employees). We want to be where the shipowner expects us to be. Why are we increasing the number of subsidiaries around the world since we presently already have more than 50? Well quite simply because we want to further increase our service capabilities around the world in order to even better serve our customers. We have to follow our customers and have service outlets in all ports where we can justify having technicians. There are still numerous ports in the Far East, India, Middle East and Europe where we are currently not represented. I have made it my goal to be positioned in all those ports where our customers are in need of service. In five years from now I foresee to have some 70 to 80 subsidiaries around the globe.

**MR: Are there any other recent developments?**

**Slager:** Last year we introduced the Global Service House, a central department in Rotterdam, to provide efficient service tools to all RH branches and safeguard the exceptional level of technical know-how within the Radio Holland Group. One of the most important tools is the global service database, housing all service request information, which allows Radio Holland to proactively monitor equipment status for the merchant shipping market, ensuring fast situation assessment and providing valuable management information to the shipowner. Many shipowners, such as recently P&O Nedlloyd and Beluga Shipping, have outsourced maintenance & service management to Radio Holland.

**MR: What are some challenges facing Radio Holland Group?**

**Slager:** Your network is only as strong as its weakest link, and the number one challenge is to maintain the knowledge of all of our technicians to support our worldwide organization. In some countries they simply don't have the maritime educational infrastructure, so we've started our own training school in the Netherlands to train young technicians. When they are ready, in a year or a year and a half, they will move to branches around the world to spread this base of knowledge. To date, this has not limited our expansion. But when we open a new branch, we always start with service, and the sales automatically follow.

We are also working together with the Dutch maritime college (The Maritime Academy of the ROC Nova College (IJmuiden)) to develop an internet application to facilitate e-learning and training for radio-, navigation- and VDR (Voyage Data Recorder)-surveyors. With this e-learning application the Radio Holland surveyors can test and keep their knowledge on Rules and Regulations up-to-date right from their desk. Surveyors inspect the maritime equipment on board and determine if the equipment meets the International Requirements. We have signed a cooperation agreement with Germanischer Lloyd to carry out worldwide radio surveys, and we expect to sign similar cooperation agreements with other classification societies soon.

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**MR: What is your assessment of the competition?**

**Slager:** We, of course have many competitors, however there is not one single competitor with a network as expanded as ours. Others continue to extend their networks, and we must continue to expand ours. We currently have four

offices in China, and intend to open three more, at the latest next year.

**MR: Where do you see growth opportunities?**

**Slager:** While China is important, it is not the only engine for growth. Supplying electronics for the Oil and

Gas (O&G) sector is growing fast too. O&G business is very interesting right now. The European inland shipping market is another growth area for us, as is the Middle East, which is rapidly improving its maritime infrastructure. On the vessel side, the megayacht market is very attractive with substantial

growth. Another area of growth for our business is in the sale of airtime. We supply both the communications hardware and the airtime contract, all in one complete package. We like it because it is recurring business, and we intend expand the push of airtime sales through our whole group.



Left: Radio Holland counts the maintenance of its service expertise as a top priority. "Your network is only as strong as its weakest link, and the number one challenge is to maintain the knowledge of all of our technicians to support our worldwide organization," said David A. Slager, the company's Chairman of the Board & CEO.

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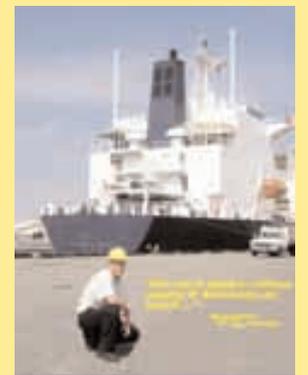
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## Mascoat Products

4310 Campbell Road  
Houston, TX 77041 USA  
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Fax: 713-465-0302  
www.mascoat.com  
email: gmore@mascoat.com



Mascoat Products has released another great coating called Delta dB Sound Damping Coating. Delta dB coating is spray, roll or brush on coating designed to decrease structural or mechanical noise through substrates and surfaces. Its coating format allows for easy application to aluminum, stainless, or carbon steel decreasing sound transfer as much as 80%. Delta dB is specially formulated in a visco-elastic resin with sound damping fillers. Testing has shown extraordinary results in thickness of 60 mils (1.5mm). The coating is water based and in accordance with IMO regulations. Contact Mascoat Products, Houston, TX 713-465-0304 - www.mascoat.com.

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## GCS Corrosion Consultants, Inc.

### Consulting & Engineering Research

3 Cooper Drive  
Howell, NJ 07731  
USA  
tel: 732-363-8820 • mobile: 732-977-9402  
Dr. Gerald Soltz, President/principal investigator  
email: ludite@juno.com

For more than 25 years our firm has specialized in advising clients on effective corrosion control methods. Our international consulting services include:

- Examining stainless steel cargo tanks for corrosion problems to help determine the causes.
- Recommending how to prevent cargo tank damage.
- Recommending repair procedures and supervising the repair and surface reconditioning of damaged stainless steel tanks.
- Preparing instruction manuals for proper use and maintenance of stainless & coated cargo tanks.
- Supervising the application of internal tank coating systems.
- Recommending surface preparation procedures that help to maximize coating service life.
- Running research programs on corrosion control methods.
- Assisting as an Expert Witness (Corrosion) on legal cases.
- Lecturing company staff on vessel corrosion control methods.
- We have developed a reusable-testing unit; for measuring the contamination levels on surfaces being blasted and coated.

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# Corrosion Control in Chemical Tankers

There are three generic coating systems and four grades of stainless steel generally used by the marine transportation industry for cargo tank linings. This paper explains the chemical resistance and corrosion limitations of these materials.

## Stainless Steel Damage from Chemical Carriage

The most common corrosion problem occurring in stainless steel cargo tanks is pitting. The pitting of the stainless steel alloys is usually caused by the presence of chloride ions in the cargo itself or from chloride ions left over from saltwater tank cleaning. There is also a danger of surface dulling, roughening and pitting by aggressive acid cargoes such as wet phosphoric acid.

Do not carry cargoes that destroy or even slightly damage the stainless steel's highly protective, passive film. This invisible surface film is composed of chromium oxide. Most corrosion data does not explain that this protective oxide is the key corrosion control mechanism in stainless steel cargo tanks.

Corrosion data generally states that metal losses below 0.002 in. (50 microns) per year are excellent. This amount of corrosion wastage per year is not acceptable in cargo tanks. Whenever metal surfaces corrode, they rarely remain smooth to the touch or bright in general appearance. Stainless steel tanks will quickly become dull and discolored if any surface corrosion occurs. This discolored tank condition would not be acceptable for load inspections. Therefore, virtually no corrosion is permissible in stainless steel cargo tanks. In fact once the stainless steel's surface becomes dull or roughened, it loses its ability to remain uniformly passive. To regain this important corrosion control factor the stainless must be properly reconditioned.

It is very difficult to find corrosion data that relates to the many variables occurring during the marine transport of chemicals. These variables include: time in transit, agitation, temperature, cleaning procedures, product purity, salt contamination from the marine atmosphere etc.

Shore side transportation of chemicals by rail, truck or shipping container, is less problematic than marine tanker operations. These smaller transportation units usually carry only one type of chemical. Further, they are not washed nearly as often as tanks in the marine industry and they are never washed with seawater.

## 4 Grades of Stainless Steel Used in Chem Tankers

The four grades of stainless steel commonly used for marine transportation vary greatly in their ability to resist corrosion attack. The 304L, 316L and 317L alloys are austenitic in structure. The newer more corrosion resistant types of stainless steel are duplex in structure. The duplex stainless steels cost more per pound, but they are also stronger than austenitic stainless. Duplex stainless steel can therefore be used in thinner structural sections that still have the same strength as thicker sections of austenitic stainless steel. This higher strength factor helps to compensate for the higher duplex material cost.

Note the L designator found after the alloy type indi-



Normal luster of stainless steel.



Damage overhead and bulkhead.

## 3 Levels of Stainless Repair

**Reconditioning:** We find that when minor stainless steel surface problems are corrected early, the damaged stainless can usually be reconditioned to make it function normally again. This critical reconditioning work can usually be done at a cost that is comparable to normal tank coating renewal.

**Full Repair:** Required if the stainless surface has become moderately to heavily damaged. The cost for full - welding and heavy surface grinding - repair work usually costs 5-10 times more per sq. m., than doing the easier reconditioning procedure. After being repaired, the stainless steel surfaces still must then be reconditioned.

**Plate Replacement:** In some severe cases, stainless steel plate replacement may become the only practical solution remaining. Stainless steel plate renewal work is the most expensive repair option, as it requires special welders and material handling procedures that are not available in most shipyards. Once plates are being removed, even more problems are usually created due to the burning of coatings on the other side of the plates. Additional work and time delay will usually be needed to repair or replace damaged coatings, particularly if the adjacent space is ballasted.

cates that the stainless steel alloy contains very little carbon. This very low (under 0.03% C) level of alloy carbon prevents corrosion resistance loss problems caused by heat from welding the stainless materials during construction or repair of the ship.

The 304L stainless steel contains no molybdenum. This stainless material is used very widely in the shore-side chemical industry when chloride contamination is not a problem. It has much lower resistance to chloride pitting compared to the other three grades more commonly used for marine transportation and it is not used widely. Therefore, when 304L is present in a tank, more care must be taken to prevent pitting problems particularly when saltwater cleaning procedures are used. Aggressive cargoes such as wet grade phosphoric acid should be avoided if 304L is present. Note that the corrosion resistance of 304L is often better than 316L when chloride ions are not present; this is why it is more commonly used shore side.

The 316L grade of stainless contains between 2.00-2.99% molybdenum. It is the most common type of stainless steel used for marine chemical transportation. It is much more resistant to pitting problems from chloride ions when compare to 304L. However, if it is used improperly, pitting can still occur, particularly if improper saltwater cleaning procedures are followed or if an over aggressive wet grade phosphoric acid is carried. It should also be noted that some 316 alloys contain less molybdenum than others, even though both are listed as the same alloy. The 316l alloys with more molybdenum are more expensive, but they usually perform better.

The 317L grade of stainless steel contains between 3.00-3.99% molybdenum. This alloy is considered a better grade of stainless steel than 316L; but it still is not immune to pitting attack if handled improperly. This expensive grade of stainless is not commonly used in the marine trade.

The newer duplex grades of stainless steel are being used more widely for chemical tankers, as they are more resistive to pitting than even 317L stainless. They may prove to provide enough pitting resistance, to solve a corrosion problem that has plagued stainless alloys since they were first developed in the early 1900s.

## Coating Damages from Chemical Carriage

Epoxy Phenolic coating systems are widely used because they are well proven to have excellent chemical cargo resistance. These coating systems must be very carefully applied, over properly prepared surfaces and then properly cured, in order to achieve their maximum possible chemical resistance and life span. If strong solvents cargoes are carried before the coating has fully cured, the systems life can be greatly reduced. In the case of the epoxy-phenolic coated tanks, blistering or general coating breakdown are the major causes of failure.

Chemically resistant epoxies are also suitable for many milder chemical cargoes, but they are not as chemical or solvent resistant as the phenolic-epoxies.

Inorganic zinc coatings are excellent for carriage of

## Which is better for Marine Chemical Transportation: Stainless or Coatings?

While there is no question that many grades of stainless steels have a much broader general corrosion resistance than coatings, stainless is not always the most economical choice for transporting many easy to handle cargoes. The current industry trend of building mainly with stainless, rather than coating and stainless should not be followed blindly. The very successful use of lower cost coated tankers has been well proven. In fact, when transporting many cargoes, coatings are sometimes a better choice than stainless, particularly the lower quality grades of stainless. The decision to build only with stainless, is not always the no-brainer many people think it is.

strong solvents; but they are rapidly destroyed by any chemical cargoes that are not almost neutral in pH i.e. in the 6-8pH range. In spite of this limitation, the inorganic zinc coating are still very suitable for large numbers of cargoes. They have been widely used for more than 40 years. The use of acidic or alkaline solutions for cleaning tanks lined with inorganic zinc should be avoided.

### Chemical Cargo Handling Precautions

The Cargo Handling Precaution notes are numbered 1 to 4. For some cargoes, more than one cautionary note is required to address different problems occurring with each type of tank lining. The following is a general listing:

#### Note 1: (Pertaining to both coatings and stainless steel linings)

Note both stainless steel or coating damage is possible from improper handling of unstable, hydrolyzable solvents and chlorinated hydrocarbons.

Products such as acetates, brominated and chlorinated compounds/solvents tend to hydrolyze in the presence of water to form organic or mineral acids. These chemicals are only suitable for storage in coated or stainless steel tanks that are kept dry, the presence of any moisture makes them more aggressive or unacceptable.

#### Note 2: Inorganic Zinc Coatings

Some attack of the inorganic zinc is possible. There is a 6-8 pH limitation for any cargo carried in inorganic zinc.

Acid attack of the inorganic zinc by oils and greases that are high in free fatty acid.

Vegetable and animal oils, fats, greases can contain free fatty acid. The suitability of inorganic zinc to carry these products depends upon the amount of free fatty acid present.

If the free fatty acid content is high, the cargo can react with the zinc in the coating to form very difficult to remove surface deposits (insoluble soaps). These difficult to remove soaps occur more on lithium based inorganic zinc's than with the ethyl-silicate types

Even relatively high levels of free

fatty acid usually do not attack the epoxy phenolic coatings, but the less chemically resistive straight epoxy coatings can be damaged if the free fatty acid content exceeds about 10-20%.

Alkaline attack of inorganic zinc by amines is possible. Most amines can be transported in inorganic zinc lined tanks if they are water free.

#### Note 3: For Organic Type Coatings (Epoxy)

Problems are mainly caused by carriage of very strong solvents or aggressive cargoes.

Epoxy phenolic coatings should be fully cured before carriage of strong solvents is permitted.

Carriage of strong solvent cargoes such as ketones, chlorinated solvents, ethanol and methanol involve a high degree of risk to organic coatings particularly in recently coated tanks. These epoxy phenolic coatings must first be fully cured by transporting hot oil for several months. Note this high temperature curing also makes the coatings more brittle and this factor can reduce the longer-term service life of the coating.

Epoxy or epoxy phenolic coatings must be allowed sufficient time to recover after transporting this cargo.

Failure to allow the proper diffusion of this cargo from the coating after its carriage, can lead to coating blistering and failure. This problem can be prevented by venting the tank for a sufficient time before reloading. In addition, some subsequent cargoes are more dangerous to load after this cargo than others.

Coating discoloration or staining is possible.

Some cargoes such as fish oil and cargoes containing carbon can stain organic linings. These stains may be difficult or impossible to remove but they normally do not affect the lining's chemical resistance, nor normally contaminate subsequent cargoes. However, the cargo-loading inspectors may show concern about using the discolored tank.

#### Note 4: Cargo Damage is Possible

Monomers and other non-stable chemicals: While the tank's lining is resistant

to these chemicals, the lining or other surface contaminants may affect the cargo itself. In addition, cargo tanks adjacent to tanks carrying these cargoes must not be a source of heat. Cargo carriage in wing tanks may be dangerous during the summer months in tropical climates, due to high solar heating of the side shell.

- Beverages, Foods and Other Potable Liquids: Although the coating itself may be unaffected by these liquids, no warranties can be made on the effect of taste or odor imparted to the liquids from the lining.

- Solution Discoloration Occurred During Testing: The tests run on the product indicated that the product solution became discolored. This discoloration did not appear to affect the product and it has not been reported in actual service.

There is also some possibility of zinc pickup in the cargo causing product contamination (for example military jet fuel carriage is not permitted in zinc coated tanks).

#### Some Additional Precautionary Notes

- Tank Cleaning Procedures: The tank cleaning procedures followed after discharge of cargoes can affect the service life of both coatings and stainless steel.

- Variable Type Cargo (Usually Crude): Products such as coal tar, wine alcohol, wet phosphoric acid, etc., can vary in composition and pH from grade to grade and batch to batch and loading temperature. Prior to stowage, the specific grade should be ascertained and checked with the manufacturer of the tank lining. This precaution is recommended for all tank linings including stainless.

- Test Data is not Available: Some chemicals have never been evaluated in regard to suitability of use with a specific tank lining. When information describing the effects of a specific cargo is not available, it should be carried at the shipper's risk.

- Carrying a New Chemical Cargo: It should also be pointed out that some chemical names are very similar, and there may be only one letter difference between two very different chemicals.

This can lead to problems unless great care is taken to insure that the chemical being shipped is identified properly. Problems can also occur if different isomers of the same chemical react differently with the tank's surfaces.

#### Conclusion

The chemical tanker trade has been expanding rapidly over the past 50 years. Over most of this growth period three generic coatings types have been used as the main protective materials for tank linings: epoxy; epoxy phenolic and inorganic zinc.

While all these coating systems have worked well when used properly, they have a much shorter effective working life than the ship itself. Typically, a properly applied coating system will last between 7-10 years. During the typical 20 year life of a well-run chemical tanker, each of the vessel's tanks will need recoating only one or two times. On a poorly run vessel, the cargo tanks may require recoating as much as three times over 20 years. The working life of a tank coating system depends on many factors including:

- The coating material used.
- The care taken during its application.
- The care taken to cure the coating properly.
- The types of cargoes it has carried.
- The proper venting of tanks after carriage of solvent.
- The amount of tank cleaning done.
- The procedures the ships crew uses during tank cleaning.

Recently the trend in the marine transportation industry is to build with stainless steel rather than coat tankers. This makes sense from the aspect that properly handled stainless steel tanks can last the 20 years of expected vessel life. The problem is that even stainless steel has limits. In fact, during the past 30 years, we have examined and supervised the repairs on a number of damaged stainless steel tankers that were pushed beyond their corrosion resistance limits.

## About the Author

Dr. Gerald Soltz is the president of GCS Corrosion Consultants Inc. He has been working in the marine corrosion control field for over 40 years. Dr. Soltz is a graduate of the U.S. Merchant Marine Academy (Kings Point) and Corrosion Science Department of Manchester University (U.K.). He taught Corrosion Science in the Department of Ocean Engineering, at the University of Rhode Island. He has worked on surface preparation procedures for improving the service life of tank coating systems. He has developed a practical procedure which economically reconditions lightly damaged stainless steel cargo tank surfaces. He has worked as a corrosion control consultant to many shipping organizations worldwide. He has conducted corrosion research studies for the U.S. government and the British Admiralty.

### ASBA Quality Initiative

The Association of Ship Brokers and Agents (U.S.A.), Inc. agent members raise the bar for agency companies in the US by implementing a certification process that is intended to assure principals of member agent's quality and credibility in three areas: sound handling of principal's cash, adequacy of insurance

coverage and competence of staff. To qualify for certification all member agents must submit an annual procedure report from an external CPA, insurance coverage of \$1M per event of liability, automobile and workmen's compensation as required. All agents employed by member companies have passed the ASBA Agent Exam that tests their

knowledge of the industry and agency business. ASBA is the U.S. member of FONASBA, the international agents and brokers association, which has as one of its core values the promotion of the highest levels of professionalism in the agency and broking professions worldwide. FONASBA therefore fully endorses ASBA's actions in developing and introducing this initiative. Visit our website at [www.asba.org](http://www.asba.org) for full details regarding our Guidelines for Certification.

the U.K. and the U.S. The purchase price totals approximately \$123.6 million in the form of cash and through the assumption of loan-repayment obligations. CRP was founded in 1974 and is currently controlled by Barclays Private Equity. The company has five production units in Skelmersdale (also head office) and Barrow-in-Furness, in the U.K., as well as in Randolph and Canton, Massachusetts, and Houston, Texas.



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### Security Training Program Receives Approval

**Bill Zazzo**, Director of the Seattle Maritime Academy, and Tom Bradley of Captain Bradley Marine Consultants announced that the U.S. Coast Guard National Maritime Center (NMC) and Maritime Administration (MarAd) have approved their Maritime Security Awareness (MSA), Vessel Security Officer VSO, Company Security Officer CSO, and Facility Security Officer FSO security training programs. The programs have also been certified by Det Norske Veritas (DNV).

### Trelleborg Completes CRP Acquisition

Trelleborg's acquisition of CRP through its Engineered Systems business area has now been concluded. CRP Group is an engineering company with annual sales of slightly more than \$130 million and 500 employees, primarily in

### Keppel FELS Secures ENSCO Order

Keppel FELS Limited (Keppel FELS) won a repeat order for an ultra-deepwater semisubmersible drilling rig from a wholly-owned subsidiary of ENSCO International Incorporated (ENSCO). The total project value is approximately \$338 million. The semi is scheduled for delivery in the first quarter 2009.

To be named ENSCO 8501, this rig is similar to the first semi, ENSCO 8500, which ENSCO ordered with Keppel FELS in September 2005. Both semis will have the capability of drilling in water depths of up to 8,500 ft, and can be readily upgraded to 10,000 ft water-depth if required. Each rig is fitted with a DPS2 dynamic positioning system, eight 2600#kW thrusters and a single conventional drilling derrick system, with accommodation for up to 150 persons. The pontoons and lower hull columns of the two ENSCO semis will be built in the Keppel Philippines shipyard in Batangas.

### Transas Wins S-VDR Deals with Jo Tankers, Torm

Transas Norway AS announced its agreement with shipping company, Jo Tankers, to supply and install 19 (S-VDR) Simplified Voyage Data Recorders to the Jo Tankers fleet. The vessels vary in size up to 40,000 dwt, and are designed to safely carry nearly any kind of liquid product ranging from specialized chemicals and acids, to edible oils and potable alcohols.

Transas Scandinavia AB signed a deal with global shipping company Torm to fit 30 Simplified Data Recorders (S-VDR) complete with 20 Electronic Chart Display and Information Systems (ECDIS) to their fleet.

### Aker Yards and Brittany Ferries LOI Confirmed as Order

The Letter of Intent (LOI) for a RoRo-passenger ferry signed on December 23 by Aker Yards and the French company Brittany Ferries was confirmed as a firm contract worth approximately \$133.24 million. The vessel will be delivered from Aker Yards, Finland in October 2008.

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## InteliDrive DCU-Marine Engine Controller



InteliDrive DCU-Marine is a new engine controller from ComAp designed to provide a high level of performance coupled with extensive communication capabilities and incorporating hardwired safety functions and primary/secondary power switching. The new controller is easily integrated into the ship's control system and takes on board the full communication capability with electronic engines. ComAp developed this capability for its genset controllers through the use of J1939 and redundant J1587 communication buses.

Circle 5 on Reader Service Card

## Max-Q Watermaker Updated



The Max-Q Series from FCI Watermakers is now available with updated features, allowing users to produce fresh clean, water more efficiently. The Max-Q is available with a new version of the Universal Reverse Osmosis Controller (UROC), allowing users to customize and operate their watermaker from a remote location or personal computer. An RS 485 connection provides remote access up to 4,000 ft. away.

Circle 6 on Reader Service Card

## Machinery Alignment Kit

Pinpoint Laser Systems introduced a new, precision, machinery alignment kit for use in factories and manufacturing facilities. This new Right Angle Alignment Kit combines the Laser Microgage with a new 90-Line Optical Squaring attachment for checking the



squareness and parallelism of machinery. These products allow plant personnel to check and align their own manufacturing equipment when they need to. The Right Angle Kit is ideal for checking machine beds, vertical cutting machinery, roll parallelism, squaring

slides and gantries, and measuring geometric parameters. The laser beam enters the 90-Line through a port in the front and exits out a side port at precisely 90 degrees to the incoming beam. Special internal optics allows operators to place the 90-Line anywhere along the

laser path and establish precise right angle references. By rotating the front nosepiece, the right angle laser beam will swing through a full plane for checking the squareness of machine parts and surfaces.

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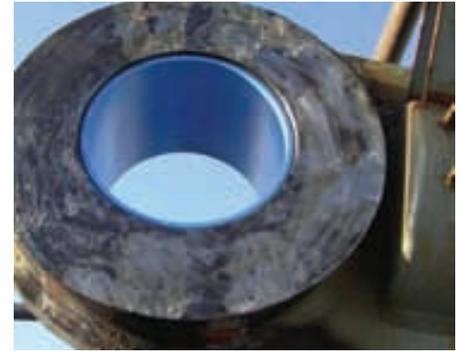
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## New Products

### Thordon Introduces New Bearing

Thordon Bearings introduced ThorPlas, a new proprietary engineered (non-elastomer) thermoplastic bearing. ThorPlas expands the range of applications where Thordon bearings can be specified. The manufacturer says that ThorPlas® offers these advantages:

- Greasing is eliminated including the labor, cost and potential pollution source
  - Increased strength and rigidity allowing working pressures in an interference fit bearing up to 31MPa (4500 psi)
  - Internal lubricants formulated into ThorPlas reduce friction, resulting in smooth operation without lubrication
  - Operates above and below the water line
  - ThorPlas machines easily, and dust-free, to suit required dimensions
  - Installation is quick and easy using freeze fit techniques.
- Thordon has been test marketing ThorPlas since 2003 and has many



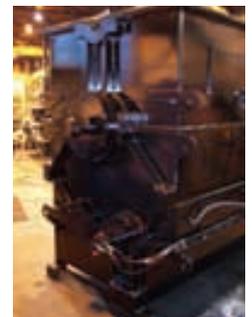
ThorPlas self loader boom bushing at Grand Bahamas Shipyard.

installations in operation and working successfully. Typical marine applications include steering gear tiller arm and jockey-bar linkage bushings, fairleads and rope rollers, self unloader booms, cranes and hoists, barge trolleys, davits and gantrys, door and ramp hinge bushings and hydraulic cylinder rod ends.

Circle 8 on Reader Service Card

### Markey Delivers Electric Hawser Winches for Tugs

Markey Machinery Company of delivered two 100 hp type DESF-48 type electric hawser winches for installation on a pair of 30 m, 4475 kW tugs



currently under construction at Washburn & Doughty for Crescent Towing and Moran Towing. The new design incorporates all the same features as a larger unit featured on Crowley's Response, but in a smaller package and with a reduced horsepower requirement. Markey's new DESF-48 design is built for up to 230 m of 76mm UHMWPE-type soft-line, includes a heavy-duty levelwind and a three-speed automatic transmission to provide ratings from 166 Tm line-pull to 183 m/min. line-speed. Also featured in this new design is a water-cooled slip-brake with capacity to dissipate up to 400 kW in braking energy. Controls in the wheelhouse include a display for all parameters of winch and drive-system operation including active display of line-tension in all modes of operation.

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### IMO AB Increases Pump Flow Limit

IMO AB has increased the flow rate of the ACE-type pump by 20 percent, to above 11 cu. m./hr.

IMO AB ACE pump type is one of the most commonly used displacement pumps for pumping oil in marine and

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John Tercek, VP Commercial Development, Royal Caribbean Cruises

We fully endorse Seatrade Med 2006 and urge our members to actively participate.  
Nicola Coccia, President, Confitarma (Italian Shipowners & Shipmanagers Association)

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Circle 249 on Reader Service Card



industrial applications around the world.

"This implies that we will meet the magic specification limit of 10 cu. m./hr., with this core product," said Jon Berggren, responsible for IMO AB marine sales. The result of this unique, new rotor lead design by IMO AB, is an increased flow of the ACE pump to meet specified duty flows above 10 cu. m./hr. The new rotor set will be fitted in the same, body utilizing all design features such as compactness, available with magnetic coupling.

Circle 10 on Reader Service Card

## New Pressure Transducer



The PX2471 Series Pressure Transducers are designed and tested to meet the new Marine Pressure Standards MIL-T-24742(SH) and ASTM F2070 when invoked. Applications for the PX2471 Series Marine Pressure Transducers include naval shipboard use, both on surface and sub-surface vessels, as well as general marine uses on new construction and ship overhauls.

Available in gauge (psig), sealed gauge (psis), absolute (psia), vacuum, and compound ranges from 0-30 in-Hg to 0-10,000 psi, the PX2471 Marine Pressure Transducers are also available in custom ranges as low as 10 in-H<sub>2</sub>O. Built-in test points make calibration and system function verification fast and easy while their modular design allows easy field servicing. The output, which is commonly used for recording or control purposes, is a 2-wire 4-20 mA signal powered by 28 Vdc.

Circle 11 on Reader Service Card

## Iveco Motors Debuts Engines to North America

Iveco Motors of North America, Inc., a Fiat Powertrain Technologies (FPT) company, unveiled its Vector family of diesel engines to the North American marketplace. The Vector family consists

of 8, 12, and 16-cylinder diesel engines with a horsepower range of 640 hp to 2,368. The Vector family features a V-type cylinder configuration with four valves per cylinder, and a high-pressure common rail injection system. The engines are turbo-charged, aftercooled and can be either an air to air intercooler or an air to water intercooler.

The Vector 8-cylinder has a displacement of 20L and has a gross power rating up to 1,184 hp; the Vector 12-cylinder has a displacement of 30L and has a gross power rating up to 1,777 hp; and the Vector 16-cylinder has a displacement of 40L and has a gross power rating up to 2,368 hp. Options available include: oil pan configurations, hydraulic fluid pumps, air compressors, air conditioning compressors and flywheels. Multiple gear-driven power takeoffs are also offered.

Circle 12 on Reader Service Card

## Digital Force Gauge with USB output

Handheld ZP gauge is designed to accurately measure any push/pull force such as instrument key pressure, spring tension, or peel resistance, and now records and processes 1,000 actual measurements/second and can transmit them through its USB output. The unit features programmable set points, selectable units, and capacities up to 1,100 lbf.

Circle 13 on Reader Service Card

## Second Generation Navmaster ECDIS

PC Maritime launched the second generation, DNV type-approved Navmaster ECDIS (Electronic Chart Display and Information System). Now a member of the Charente Group of companies, PC Maritime is set to market Navmaster worldwide and intends building a network of agents and distributors to support the product globally. Among Navmaster's distinguishing features are:

- uniquely detailed berth-to-berth route planning incorporating the navigator's instructions and notes;
- enhanced passage plan documentation that can be used to conform to ISM and company quality standards;
- voyage dated record and replay module for vessels not yet required to carry type approved VDR to provide evidence in the event of incident;
- automatic transfer of monitored route to back-up.

Circle 14 on Reader Service Card

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Circle 213 on Reader Service Card

# Responsiveness is focus at Ward Leonard

The nature of naval warfare is changing; the nature of technology is changing at the same time. Together, these changes are having a profound impact on vessels, human resources, tactics, and seaworthiness.

Leading edge electronics like those being designed by Ward Leonard Electric Co., are focused on highly demanding situations and the ever advancing requirements of current and future naval systems. Command and control systems, as well as the technologies that translate orders into actions, must be more precise, more adaptable, and more durable than ever. The all-electronic Navy and the high-speed demands of immediate responses are creating an environment where suppliers have to create products that respond now.

At Ward Leonard Electric Co. Inc. of Thomaston, Conn., experts and technology developers in naval motors and control systems as well as electronics and power systems, are responding to naval and marine needs on multiple fronts:

- The company is focusing on making high-function products that take advantage of new technologies and developments in materials and manufacturing techniques.

- It is applying new developments in engineering to traditional and replacement products and making them lighter, faster, and simpler to use.

- It is applying proven products and processes to new areas, including homeland security, mining, petroleum and construction.

All of this is supported by a new generation of engineers, steeped in industry knowledge and focused on the increasingly stringent demands of the marketplace.

## New Engineering Group

To meet the mission-critical requirements of customers who range from the Department of Defense to major defense contractors to OEM suppliers, a strategic engineering group has been formed under Bill Tortora, senior vice president of Advanced Business Development. The first products from the group will hit a hungry marketplace shortly, and the group is influencing response to requirements from current clients by adding value and new technology.

"We knew that our traditional great products were not going to be good enough going forward," says CEO Jon Carter. "So we leap-frogged the next turn of the technology wheel and created a dynamic team that is creating new products and processes at a pace that is exhilarating."

Of course, taking care of business and customers who expect 100-plus-year-old Ward Leonard to be there when called is another mission that cannot be overlooked. The military business and the high-intensity commercial customers receive the same personal service that has made Ward Leonard a consistent supplier to the Army, Navy, Marines, and Coast Guard.

"After being around as long as we have, customers expect a high level of performance," says Peter Morehouse, Vice President of Sales and Marketing. "As a result we set near term goals to decrease our response time to customer requests and product lead times for customer orders; our customer base is demanding this and we are eager and ready to respond to their needs."

Morehouse adds that the precision of Ward Leonard engineering and manufacturing are valued by engineers and designers in multiple industries, as are the improvements that are built into their products, new and existing alike.

For example, the company has just announced a new line of motor driven rotary relays, designed to switch current between controlling devices and electrical components. The relays, which directly replace earlier models that currently exist in the market, are designed for longer service than those produced by competitors. Ward Leonard will keep the most requested models in stock and has parts for the rest of the line on hand and ready to be assembled.

## Acquisition, Advanced Applications

In response to a need that the company identified for modern naval applications, it developed a solid state communications controller that works with up to three overload relays aboard a ship, thus providing important management information and eliminating equipment previously required. The controller is designed to work with common local area net protocols and installs quickly and efficiently in most applications.

On another technology front, in mid-2005 the company acquired the assets and intellectual property of Mawdsley's Motors of Great Britain, a well-known supplier of motors for multiple industries, including transportation, naval and military applications.

Ward Leonard is maintaining a design engineering presence with some manufacturing and test capability in the United Kingdom. The majority of the manufacturing has been transferred to and will be conducted in the Connecticut plant.

During a recent visit to Ward Leonard Headquarters, Rep. Nancy Johnson, R-Conn., highlighted the company's success in developing advanced



Ward Leonard's newly unveiled motor-driven rotary relay (MDR): one of the several new products responding to customer feedback.

products for defense and other high-stress applications during a tour of the development laboratory and manufacturing plant. Johnson is a senior member of the House Ways and Means Committee and chairman of the Health Subcommittee.

With world-class engineering and a modern 140,000-square-foot research, development and manufacturing facility, in Thomaston, Ward Leonard excels at developing and manufacturing innovative engineering solutions that meet or exceed established standards for motor control and motor efficiency, reliability and resiliency. The company continues to focus on its traditional military markets, both as a direct supplier of replacement parts and assemblies as well as a key subcontractor on major construction and overhaul projects.

Ward Leonard quality assurance processes guarantee that motors and control systems are fault-free. The calibration system meets MIL-STD-45662 standards while all assurance functions meet MIL-I-45208 and MIL-Q9858 as needed.

"The outlook is exciting, as we develop new products, apply new technology to traditional products and move into custom engineering. Our vision is to be the most respected and responsive supplier in our industry," said Morehouse.



A technician inserts coils into the stator of an AC motor.



Ward Leonard employees insert a contractor into a motor controller at the manufacturing facility in Connecticut.

**Omegadyne**

The PX2471 Series Pressure Transducers are designed and tested to meet the new Marine Pressure Standards MIL-T-24742(SH) and ASTM F2070 when invoked. Applications include naval shipboard use, both on surface and sub-surface vessels, as well as general marine uses on new construction and ship overhauls.



**Circle 101**

**Autohydro**

Autohydro is a hydrostatics and stability program that performs intact and damage analyses and produces customized stability reports which are accepted by all major governing approval bodies. ASC is known for CAD/CAM software used in phases of naval architecture and ship production.



**Circle 102**

**Defelsko**

The redesigned PosiTector 6000 Coating Thickness Gage from Defelsko Corporation has new tougher features. Still simple, durable and accurate, the PosiTector 6000 retains all of its simplicity and functionality for measuring coatings on all metals. New features include large impact-resistant Lexan display, IP5X ingress protection and protective rubber holster.



**Circle 103**

**Sherwin-Williams**

Sherwin-Williams Industrial and Marine Coatings is equipping its corrosion specification specialists with a software program, Site Survey, designed to enable plant maintenance decision-makers to maximize their investment in plant assets and minimize plant maintenance costs. It is used to improve maintenance painting planning.



**Circle 104**

**Metals USA**

Metals USA is a provider of large sheets of steel for shipbuilding with facilities. The facilities use a Wheelabrator Blast and Paint Line System. Designed to blast 12-ft. wide raw steel plates and small structural shapes, it is primarily used to blast plates for shipbuilding. With the new machine, only one operator is required.



**Circle 106**

**NLB**

The 605 Series water jet pump units from NLB Corp. offers up to 600 hp and 143 gpm. A simple conversion kit lets users operate at any of five pressures to suit their applications: The NLB 605 Series units all feature an internal gear pac instead of a traditional external drive.



**Circle 107**

**Noxudol**

Noxudol 3101 is a sound damping paste intended for metal and plastic in thickness between 0.02-.20 in. It is a waterborne viscous elastic sound damping paste based on polymers, developed for users who have high demands on fire safety. Due to its viscous elastic flexibility, it converts sound producing resonance into heat. It contains anti corrosives and gives protection against condensation.



**Circle 108**

**Altair**

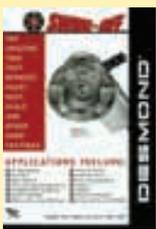
The Altair Single-Gas Detector from MSA Instrument Division features three sensor options: carbon monoxide, hydrogen sulfide and oxygen. Carbon monoxide and hydrogen sulfide versions can operate for over two years. Advanced design offers superior dust and water protection and high resistance to RFI.



**Circle 105**

**DesmondStephan**

The Swirl-Off scarifier tool, from Desmond-Stephan Mfg., removes paint, rust, scale, barnacles, and other hard coatings from metal and concrete surfaces without heavy pressure. Using pneumatic tools, it removes marine growth underwater. Easier, faster, and safer than scraping, sandblasting, or chemicals.



**Circle 111**

**Thermo Electron**

Thermo Electron Corporation announced its new carbon dioxide, the AutoCO2. The AutoCO2 measures carbon dioxide concentrations in natural gas to maintain gas quality control at delivery points. It detects CO2 in natural gas using non-dispersive infrared technology (NDIR).



**Circle 109**

**Herrin Design**

In 1982 Herrin Design contracted with Hazen Tide Gauge, International to complete the design of Hazen's Model HTG5000 Tide Gauge, a telecommunications-linked tide monitoring system that became the industry standard for dredgers and ocean surveyors.



**Circle 110**

**Imtra**

Imtra Corporation's low-wattage/high-brightness LED spotlight, manufactured specifically for marine applications, harnesses three Luxeon 1W PowerLEDs to produce illumination equivalent to that of a typical 20-watt halogen bulb, but with consumption of just 6 watts and an estimated life of 50,000 hours.



**Circle 116**

**Sener**

Sener celebrates its 50th anniversary. Founded in 1956 by Enrique de Sendagorta, Sener was the first Spanish private engineering company that burst into the economic panorama. Sener has offices in Barcelona, Bilbao, Buenos Aires, the Canary Islands, Lisbon, Madrid and Valencia.

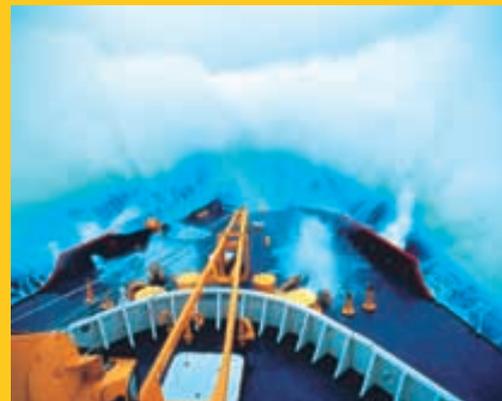


**Circle 124**

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# BUYER'S DIRECTORY

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Generon IGS, 11985 FM 529, Houston, TX 77041

## AIR CONDITIONING & REFRIGERATION

Cospolich Refrigeration, 14695 Highway 61, Norco, LA 70079

**RW Fernstrum, 1716 11th Avenue, Menominee, MI 49858, 9068635553, 9068635634, seanf@fernstrum.com, Contact: Sean Fernstrum, www.fernstrum.com**

Stork Bronswerk Inc., 3755 C Boul. Matte, Brossard, Quebec J4Y 2P4, Canada

## AIRHORNS/SIGNALING EQUIPMENT

Airchime Manufacturing Co., 5478 267th St., Gloucester Industrial Estate., Langley, BC V4W 3S8, Canada

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

## ALARMS, FACTORY-MUTUAL APPROVED

NREC Power Systems, 5222 Hwy 311, Houma, LA 70360

## ALUMINUM BOATS

Island Boats, 6806 Highway 90 East, New Iberia, LA 70560

Metal Craft Marine Inc., 347 Wellington St., Kingston, Ontario K7K 6N7, Canada

William E. Munson Co., 18130 Sunset Way, Edmonds, WA 98026

## ANCHORS & CHAINS

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

## AUTOPILOT SYSTEMS

AG Marine Inc., 5711 34th Avenue, Gig Harbor, WA 98335-8548

ComNav Marine Ltd., 13511 Crestwood Pl., Ste 15 15, Richmond, BC V6V 2G1, Canada

Mackay Communications, 2721 Discovery Dr., Raleigh, NC 27616-1851

## BALLAST

Ballast Technologies, 4620 S. Coach Dr., Tuscan, AZ 85714

Redland Genstar Inc., 300 E. Joppa Rd. Suite 200, Towson, MD 21286

## BEARING- RUBBER, METALLIC, NON-METALLIC

Craft Bearing, 5000 Chestnut Ave., Newport News, VA 23605

**Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH 44234, 440-834-5400, 440-834-4950, Contact: Richard Spangler**

Thordon Bearings, 3225 Mainway, Burlington Ontario L7M 1A6, Canada

## BOATBUILDER

AMERICAN MARINE HOLDINGS GOVERNMENT SERVICES, 1838 Turnbull Lakes Drive, New Smyrna Beach, FL 32168

Blount Marine, 461 Water St., Warren, RI 02885

Gladding Hearn, 1 Riverside Ave., Somerset, MA 02725

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

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**Merrill Marine Services, Inc., 7909 Big Bend Blvd, Webster Groves, MO 63119, 800.394.6674, 800.230.5377, pete@merrillmarine.com, Contact: Peter C. Merrill, www.merrillmarine.com**

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

Thermax, 3115 Range Rd, Temple, TX 76501

## CAD/CAM SYSTEMS

Cadmatic, Ostra Strandgatan 72 (Vita Huset), FI-20810 Turku, Finland

## CAPSTANS

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

## CARGO MANAGEMENT

**Autoship Systems Corp., 611 Alexander Street, Suite 312, Vancouver, BC V6A 1E1, Canada, 604-254-4171, 604-254-5171, sales@autoship.com, Contact: Ross Muirhead, www.autoship.com**

## CARGO MONITORING & CONTROL SYSTEM

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

## CAST IRON REPAIR

In-Place Machining, 3811 N. Holton St., Milwaukee, WI 53212

## CHAINS

G.J. Wortelboer, Postbus 5003, 3008 AA Rotterdam, Netherlands

## CLASSIFICATION SOCIETY

American Bureau of Shipping, 16855 N. Chase Drive, Houston, TX 77060

## CLOSED CIRCUIT TELEVISION

Hernis Scan Systems A/S, Postboks 619, NO\_4809 Arendal, Norway

## CNC PLATE CUTTING

Advanced Fabricating Inc, PO Box 3721, Galveston, TX 77552

## COATINGS/ CORROSION CONTROL/PAINT

Chugoku Marine Paints, P.O. Box 73, 4793, Netherlands

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

Flow International Corp., 23500 64th Ave., South Kent, WA 98059

International Paint Co., Stonegate Lane, Felling, Gateshead, Tyne and Wear NE10 0JY, UK

Mascoat Products, 4310 Campbell Rd, Houston, TX 77041

**NAPASCO, INC., 213 Main Project Road, Shriever, LA 70395, 985-449-0730, 985-449-0740, napasco@napasco.com, Contact: Pam Bartell, www.napasco.com**

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

Sigma USA, P.O. Box 816, Harvey, LA 70059

Soken Trade Corp./Noxudol, 15934 S. Figueroa Street, Gardena, CA 90248

## COMMUNICATIONS

Inmarsat Ltd, 99 City Rd., London EUY 1AX, UK

L-3 Communications, 6000 Fruitville Road, Sarasota, FL 34232

Mackay Communications, 2721 Discovery Dr., Raleigh, NC 27616-1851

Pipeline Communications and Technology, Inc., 2800 Woodlawn Dr. Ste. 264, Honolulu, HI 96822

World-Link Communications, 74 Main St., Framingham, MA 01701

Xantic, PO Box 30012, 2500 GA The Hague, Netherlands

## COMPOSITE SHAFTS

**Centa Corp., 815 Black Hawk Drive, Westmont, IL 60559, 630-734-9600, 630-734-9669, bobl@centacorp.com**

## COMPUTER/ COMPUTER SOFTWARE

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

Spec Tec, Professor Koth's Vey, 1366 Lysaker, Norway

## CONSOLE- GMDSS

Mackay Communications, 2721 Discovery Dr., Raleigh, NC 27616-1851

## CONSULTANTS

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

Elliott Bay Design Group, 5301 Shishole Ave. NW, Ste. 200, Seattle, WA 98107

Hornblower Marine Services, P.O. Box 112476, Campbell, CA 95011-2476

## CONTROL SYSTEM-MONITORING/STEERING

Amot Controls, 8640 N. Eldridge Parkway, Houston, TX 77041

Electronic Marine Systems, 800 Ferndale Pl., Rahway, NJ 07065

Electrowave U.S.A., 6125 W. Sam Houston Pkwy., Ste 406, Houston, TX 77041

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

Kobelt Manufacturing Co., Ltd., 8238-129 Street, Surrey, BC V3W0A6, Canada

**L-3/TANO-EDI, 759 Hill Street, New Orleans, LA 70121, 504-831-9800, 504-833-4119, guy.hardwick@l-3com.com**

MMC International, 60 Inip Dr, Inwood, NY 11096

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

Totem Plus Ltd, P.O. Box 164, Herzliya 46100, Israel

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

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## CRANE - HOIST - DERRICK - WHIRLEYS

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E. Crane, 241 Executive Dr., #3, Marion, OH 43302

## CRANE TESTING

Imes Inc., 5139 Brook Street Suite E, Mont Claire, CA

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

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ESAB Cutting Systems, 411 South Ebenezer Road, Florence, SC 29501

## DECK MACHINERY- CARGO HANDLING EQUIPMENT

Burrard Iron Works Ltd., 220 Alexander Street, Vancouver, BC V6A 1C1, Canada, 604-684-2491, 604684-0458, sales@burrardironworks.com

**Coastal Marine Equipment, 20995 Coastal Parkway, Gulfport, MS 39503-9517, 228-832-7655, 228-832-7675, sales@coastalmarineequipment.com, Contact: Ralph Waguespack, www.coastalmarineequipment.com**

Davit Sales, PO BOX 232, Jefferson Valley, NY 10536

Global Incorporated, P.O. Box 24, 160 Cannery Road, Somerset, PA, PA 15501

Interccontinental Engineering, PO Box 9055, Kansas City, MO 64168

Markey Machinery, P.O. Box 24788, Seattle, WA 98124

Nabrico Marine Products, 1050 Trinity Road, Ashland City, TN 37016

Norwegian Maritime Equipment AS, BOX 244, NO-5480 HUSNES, Norway

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

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

W.W. Patterson, Inc, 3 Riversea Rd, Pittsburgh, PA 15223

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Motor-Services Hugo Stamp, 3101 S.W. 3rd Ave., Ft. Lauderdale, FL 33315

## DIESEL ENGINE- SPARE PARTS & REPAIR

Chris Marine AB, Box 9025, 200 39 Malmö, Sweden

Man B&W Diesel, 17 State St., NY, NY 10004

Man B&W Diesel A/S, Teigholmsgade 41, Copenhagen SV DK-2450, Denmark

Man B&W Diesel AG, Stadtbachstrasse 1, Augsburg D-86153, Germany

Marine Exhaust Systems of Alabama, P.O. Box 698, 757 Nichols Ave., Fairhope, AL 36533

Marine Turbo & Diesel Inc., 1090 7th St., Richmond, CA 94801

Mariso USA, Inc., 12783 Capricorn Dr., Stafford, TX 77477

Motor-Services AB, Box 2115, Ronninge S-144 04, Sweden

Motor-Services Hugo Stamp, 3101 S.W. 3rd Ave., Ft. Lauderdale, FL 33315

Scardana Americas Bkg., 502 Empire St., Greenfield Park J4V 1V7, Canada

Wartsila Diesel, 201 Defense Hwy, Annapolis, MD 21401

## DIESEL FUEL DECONTAMINATION

Algae X International, P.O. Box 4011, Fort Myers Beach, FL 33932

## DIESEL FUEL INJECTORS

**Interstate Diesel, 4901 Lakeside Avenue, Cleveland, OH 44114-3996, 800-321-4234, 216-881-0805**

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## DISPLAY TECHNOLOGY

Barco Simulation, 600 Bellbrook Avenue, Xenia, OH 45385

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**The Brass Works Inc., P.O. BOX 566, DeLand, FL 32721, 386-943-8857, 386-943-8810, info@marinedoorandcabinhardware.com**

## DOORS- MARINE & INDUSTRIAL

Joiner Systems, 1925 52nd Avenue, Lacine, Quebec H8T 3C3, Canada

Juniper International, 72-15 Metropolitan Ave., Middle Village, NY 11379

Manly Marine, P.O. Box 86788, N. Vancouver, BC V7L 4L3, Canada

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

**USA Sliding Doors, Inc., 801 Hosmer Road, Churchville, NY 14428, 585-538-4160, 585-538-2806, info@usaslidingdoors.com, Contact: Mr. Robert Weiland, www.usaslidingdoors.com**

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

## DRILLS

Anchor Lamina, 38565 Country Club Drive, Farmington Hills, MI 48331

## DRIVES

Allied Systems, 2300 Oregon St., Sherwood, OR 97133

## DRIVESHAFTS

The Cline Company, 600 Buncombe St., Greenville, SC 29602

## DRUG TEST KITS

Sun State Specialty K-9s, 1500 Beville Road, Daytona Beach, FL 32114

## ELECTRIC MOTORS

Ward Leonard, 401 Watertown Rd, Thomaston, CT 06767

## ELECTRICAL EQUIPMENT

MMC International, 60 Inip Dr, Inwood, NY 11096

## ELECTRICAL SERVICES

QCI Marine Offshore, 6754 Willowbrook Park Dr, Houston, TX 77066

## EMPLOYMENT

All American Marine, P.O. Box 191237, Tillman's Corner, AL 33619

## ENGINE ROOM LIGHTING/ MONITORING & CONTROL

GMT Electronics, 171 Main St., South River, NJ 08882

## EQUIPMENT FINANCING

**AIG Commercial Equipment Finance, Inc., 5700 Granite Parkway, Suite 850, Plano, TX 75024, 972-987-3708, 972-987-3700, kirk.phillips@aig.com**

## EVAPORATORS

Alfa -Laval Separation, Inc., 955 Meams Rd., Warminster, PA 18974

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

## EXHAUST

Marine Exhaust Systems of Alabama, P.O. Box 698, 757 Nichols Ave., Fairhope, AL 36533

## EXPANSION JOINTS

Silex Inc., 6659 Ordan Dr., Mississauga, ON L5T 1K6, Canada

## EXTRUDED RUBBER PRODUCTS

Clean Seal Inc., PO Box 2919, South Bend, IN 46880

## FASTNERS

Superbolt, PO Box 683, Carnegie, PA 15106

## FENDERING SYSTEMS/ BUOYS - DOCK & VESSEL

**Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH 44234, 440-834-5400, 440-834-4950, Contact: Richard Spangler**

Maritime International, Inc., 204 Ida Rd., Broussard, LA 70518

Schuyler Rubber Co., 16901 Woodred Rd., Woodinville, WA 98072

Trelleborg Engineered Products, P.O. Box 98, Clearbrook, VA 22624

Urethane Products, 9076 Rosecrans Ave, Bellflower, CA 90706

## FIBERGLASS GRATING AND HANDRAIL

Strongwell, 400 Commonwealth Avenue, Bristol, VA 24201

## FILTERS/FILTER SYSTEMS

Algae X International, P.O. Box 4011, Fort Myers Beach, FL 33932

Boll Filter, 9822 General Drive, Ste. 180, Plymouth, MI 48170

Hellan Strainer, 3249 East 80th St., Cleveland, OH 44104

**US Filter, 2 Milltown Ct., Union, NJ 07083**

Vigilant Marine, 170 N. Maple Street Suite #104, Corona, CA 92280

## FIRE & SAFETY PRODUCTS

Brookdale International, 1--8755 Ash St., Vancouver, BC V6P 6T3, Canada

DBC Marine Safety Systems, 101-3760 Jacobs Rd., Richmond, BC V6V 6T3, Canada

IFSTA/Fire Services Program, 9030 N. Willis, Stillwater, OK 74078-8045

## LASER ALIGNMENT

Ludeca, Inc., 1425 NW 88th Ave, Miami, FL 33172

## LEAK REPAIR

Indumar Products Inc., 2500 Tanglewilde, Suite 260, Houston, TX 77063

## LIFEBOAT TESTING

Imes Inc., 5139 Brook Street Suite E, Mont Claire, CA  
Water Weights, Inc., 5139 Brook St., Ste E, Mont Clare, CA 91763

## LIFEBOATS/RAFTS

DBC Marine Safety Systems, 101-3760 Jacobs Rd.,  
Richmond, BC V6V 6T3, Canada  
Viking Life Saving Equipment, 1400 NW 159th Street Suite 101,  
Miami, FL 33169  
Willard Marine Inc., 1250 N. Grove St., Anaheim, CA 92806  
Wolung International, 151 Chin Swee Road #03-14, Manhattan  
House, 169876, Singapore

## LIFESAVING EQUIPMENT

C.M. Hammar AB, August Barks Gatan 15, 421 32 Vastra  
Frolunda, Sweden  
Stearns Manufacturing Comapny, P.O. Box 1498, St. Cloud, MN  
Viking Life Saving Equipment, 1400 NW 159th Street Suite 101,  
Miami, FL 33169

## LIFT EQUIPMENT TESTING

Water Weights, Inc., 5139 Brook St., Ste E, Mont Clare, CA 91763

## LIGHTING SYSTEMS/ EQUIPMENT

ACR Electronics Inc., 5757 Ravenswood Rd., Ft. Lauderdale ,  
FL 33310-5247  
L.C. Doane, P.O. Box 975, Essex, CT 06426  
Maritime Associates, P.O. BOX 1788, Crystal Bay,  
NV 89402, 775-832-2422, 775-832-2424,  
maritimeas@charter.net

## LINE & NET CUTTERS

Spurs Marine, 201 S.W. 33rd St., Ft. Lauderdale, FL 33315

## MARINE DECKING & FLOORING

Lonseal Flooring, 928 East 238th Street, Carson, CA 90745

## MARINE ELECTRONICS

ACR Electronics Inc., 5757 Ravenswood Rd., Ft. Lauderdale , FL  
33310-5247  
GMT Electronics, 171 Main St., South River, NJ 08882  
Hatteland Display, Bogstadveien, 19, N-0355 Oslo, Norway  
Jotron Electronics, Box 85, NO-3280T Jodalving Norge, Norway  
Marine Electronic Solutions, 1522 Crabapple Cove, Jacksonville,  
FL 32225  
Rason Inc., 100 Lopez Road, Goleta, CA 93117  
Saab Marine Electronics, Box 13045, 402 5Goteborg, Sweden

## MONITORING

Martek Marine Ltd., Century Business Park Manvers Way,  
Rotherham, South Yorkshire S60 5DA, UK

## MARINE ENGINEERING

Elliot Bay Design Group, 5301 Shishole Ave. NW, Ste. 200,  
Seattle, WA 98107

## MARINE EQUIPMENT

Scardana Americas Bkg., 502 Empire St. , Greenfield Park J4V  
1V7, Canada

## Tidewater Skanska, Inc., PO Box 57, Norfolk, VA

23501, 757-547-2153, 757-547-4806,

sby@tidewaterskanska.com

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

## MARINE HARDWARE

HMS Marine Hardware, 333 W. Merrick Road, Valley Stream, NY  
11580-5219

## MARINE MANAGEMENT

Hornblower Marine Services, P.O. Box 112476, Campbell, CA  
95011-2476

## MARINE POWER PLANT SYSTEMS

Auramarine Ltd., Box 849 , FI-20101 Turku, Finland

## MARITIME TRAINING & SCHOOLS

Marine Safety International, Marine Terminal , Laguardia Airport,  
NY 11371

## MONITORING SYSTEMS

Mackay Communications, 2721 Discovery Dr., Raleigh, NC  
27616-1851  
Prime Mover Controls, 3600 Gilmore Way, Burnaby, BC V5G  
4R8, Canada  
Reson Inc., 100 Lopez Road, Goleta, CA 93117

## MOORAGE FACILITY

Sea Ark Marine, P.O. Box 210, Monticello, AR 71655-0210

## MOTOR PROTECTION

Marine Safe Electronics, 261 Milway Ave. #12, Concord, Ontario  
L4K 4K9, Canada

## NAMEPLATES AND PLACARDS

Horizons ISG, 18531 South Miles Road, Cleveland, OH

## NAV/COMM EQUIPMENT

C- Map Commercial, 133 Falmouth Rd, Mashpee, MA 02649  
Chartco, New North Road, Hainault, Ilford Essex 166 2UR, UK  
Electronic Marine Systems, 800 Ferndale Pl., Rahway, NJ 07065  
**Furuno USA Inc., 4400 NW Pacific Rim Blvd, Camas,  
WA 98607**  
Mackay Communications, 2721 Discovery Dr., Raleigh, NC 27616-  
1851

## NAVAL ARCHITECTS, MARINE ENGINEERS

A.K. Suda, Inc., 3004 19th St., Metairie, LA 70002-4989  
Band, Lavis, & Associates, Inc., 900 Ritchie Hwy, Suite 203,  
Severna park, MD 21146  
Bay Engineering, 253 N. First Ave., Sturgeon Bay, WI 54235  
BMT Fleet Technology, 311 Leggett Dr, Kanata, ON K2K 1ZB,  
Canada  
Bristol Harbor Group, Inc., 103 Poppasquash Rd., Bristol, RI 02809  
C. Baxter & Associates, P.O. Box 9006, Mobile, AL 36609  
CDI Marine Co., 9550 Regency Square Blvd, Ste 400, Jacksonville  
, FL 32222  
Computer Sciences Corporation-Advance Marine Center, 1201 M  
St. SE., Washington, DC 20003  
Jamestown Marine Services, Inc., 1084 Shennecossett Road,  
Groton, CT 06340

## JMS Naval Architects & Salvage Engineers, 1084

Shennecossett Rd., Groton, CT 06340, 860-448-4850,

860-448-4857, jms@jmsnet.com, Contact: Blake

Powell, VP, www.jmsnet.com

John J. McMullen Associates, 4300 King St., Suite 400, Alexander,  
VA 22302

John W. Gilbert Associates, 75 Terry Drive, Suite 200, Hingham,  
MA 02043

Kvaerner Masa Marine Inc., 201 Defense Highway, Ste 202,  
Annapolis, MD 21401

MCA Engineers, Inc., 2960 Airway Ave., #A-103, Costa Mesa, CA  
92626

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

Nautical Designs, Inc., 2101 S. Andrews Ave., Ste 202, Fort  
Lauderdale, FL 33316

The Glosten Associates Inc., 600 Mutual Life Bldg., 605 First Ave.,  
Seattle, WA 98104

Vizag marine Consultants, 8913 Riverview Park Drive, Raleigh, NC  
27613

VUYK Engineering, P.O. Box 204, , 9700 AE Groningen,  
Netherlands

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

## NAVIGATION

AG Marine Inc., 5711 34th Avenue, Gig Harbor, WA 98335-8548  
ComNav Marine Ltd., 13511 Crestwood Pl., Ste 15 15, Richmond,  
BC V6V 2G1, Canada

D & B Technologies, 1458 OCEAN SHORE BLVD #132, ORMOND  
BEACH, FL 32176-3613

Nauticast AG, Mariahilfer Strasse 50/211, A-1070 Vienna, Austria

## OIL/WATER SEPARATORS

Alfa -Laval Separation, Inc., 955 Meams Rd., Warminster, PA  
18974

MMC International, 60 Inip Dr, Inwood, NY 11096

## PAINTS AND ANTI FOULANTS

International Paint Co., Stoneygate Lane, Felling, Gateshead, Tyne  
and Wear NE10 0JY, UK

## PIPE LEAK REPAIR

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

## PNEUMATIC LINE THROWERS

Restech Norway A/S, Box 624, NO-8001 BODO, Norway

## PORT DEVELOPMENT

Sasakura Engineering , 7-32 Takeshima, 4-Chome,  
Nishiyodogoaaw KY Osaka555, Japan

## PORTABLE FOAM APPLICATORS

IMSSCO Corporation, 2040 Harbor Island Drive, Ste. 201 A,  
San Diego, CA 92101

## PORTABLE VENTILATORS

Americ Corp, 785 Bonnie Lane, Elk Grove Village, IL 60007

## PREVENTATIVE MAINTENANCE

Marine Safe Electronics, 261 Milway Ave. #12, Concord, Ontario  
L4K 4K9, Canada

## PROPULSION EQUIPMENT

ABB Turbocharger, Inc., 1460 Livingston Ave., North Brunswick, NJ  
08902

Alstom Power Conversion, 3 Ave. Des Trois Chenes, 90018 Belfort  
Cedex, France

Brunvoll A/S, P.O. Box 370, N-6401 Molde, Norway  
CWF Hamilton Co., P.O. Box 709 , Christchurch, New Zealand

Fincantieri, Diesel Engine Div., GMT, Bagnoli della, Rosandra 3334  
Trieste, Italy

Harbormaster Marine, Inc., 31777 Industrial Rd., Livonia, MI 48150  
Kawasaki Heavy Indust., World Trade Center Bldg., 4-1

Hamamatsu-cho, 2-chome, Minato-ku Tokyo 105-6116, Japan  
L.A.M.E Srl. Marine Division, Via della Fornace 4, Opera (MI), Italy

Man B&W Diesel, 17 State St, NY, NY 10004  
Man B&W Diesel A/S, Telgholmsgade 41, Copenhagen SV DK-  
2450, Denmark

Man B&W Diesel AG, Stadtbachstrasse 1, Augsburg D-86153,  
Germany

Mapeco Products, 91 Willenbrock Rd., Unit B, Oxford, CT 06478  
Napier Turbochargers, P.O. Box 1, Waterside , South Lincoln LN5  
7FD, UK

Nya Berg Propulsion AB, Box 1005, 430 90 Ockero, Sweden  
Rolls-Royce Commercial Marine, 10255 Richmond Ave., Ste 101,  
Houston, TX 77042

Ultra Dynamics Marine, LLC. (UltraJet), 1110A Claycraft Road,  
Columbus, OH 43230

Voith Schiffstechnik GMBH & Co., P.O. Box 2011, 89510  
Heidenheim, Germany

Wartsila Corporation, Box 244, FI-65101 Vasa, Finland  
Wartsila Lips, 3617 Koppens Way, Chesapeake, VA 23323

ZF Marine Group , Ehlerst. 50, 88046 Friedrichshafen, Germany

## PROPULSION MONITORING

Azonix-Dynalco, 3690 NW 53rd St., Ft. Lauderdale, FL 33309

## PUMP-REPAIR-DRIVES

Scardana Americas Bkg., 502 Empire St. , Greenfield Park J4V  
1V7, Canada

## PUMPS

Mack Boring & Parts Company, 2365 Rout 22, Union, NJ 07083

## RADARS-ARPAS

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

## REFUELING EQUIPMENT

Global Incorporated, P.O. Box 24, 160 Cannery Road, Somerser,  
PA, PA 15501

## REMOTELY OPERATED VEHICLES

**VideoRay LLC, 580 Wall St, Phoenixville, PA 19460,  
610-458-300, 610-524-9846, info@videoray.com ,  
Contact: Chris Gibson, www.videoray.com/**

## RIGID INFLATABLE BOATS

Willard Marine Inc., 1250 N. Grove St., Anaheim, CA  
92806

## ROPE-MANILA-NYLON-HAWSERS-FIBERS

Marlow Ropes, South Road, Halisham, East Sussex BN27 3JS,  
UK

## ROTATING EQUIPMENT

Seatworthy, 22 Main Street, Centerbrook, CT 06409

## RUDDER BEARINGS & BUSHES

Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH  
44234

Thordon Bearings, 3225 Mainway, Burlington Ontario L7M 1A6,  
Canada

## SAFETY PRODUCTS

Brookdale International, 1--8755 Ash St., Vancouver, BC V6P 6T3,  
Canada

## D & B Technologies, 1458 OCEAN SHORE BLVD

**#132, ORMOND BEACH, FL 32176-3613, 407-647-7500,**

**407-647-7505, HOTEYE@HOTEYENOW.COM**

DBC Marine Safety Systems, 101-3760 Jacobs Rd., Richmond,  
BC V6V 6T3, Canada

Lalizas SA, 21 Haidariou St., 545 Piraeus, Greece  
Stearns Manufacturing Comapny, P.O. Box 1498, St. Cloud, MN

Stearns Mfg. Co., PO Box 1498, St. Cloud, GA 56302-1498  
Viking Life Saving Equipment, 1400 NW 159th Street Suite 101,  
Miami, FL 33169

Walport USA , 39-5A Dover Rd South, Toms River, NJ 08757

## SALVAGE

American Salvage Association, 801 North Quincy Street,  
Arlington, VA 22203

**Titan Maritime Industries Inc., P.O. Box 350485, Ft.  
Lauderdale, FL 33004**

## SALVAGE ENGINEERS

Jameslown Marine Services, Inc., 1084 Shennecossett Road,  
Groton, CT 06340

## SANITATION DEVICE- POLLUTION

## CONTROL

Envirovac Inc, 1260 Turret Dr., Rockford , IL 61111

Headhunter Inc., 3380 SW 11th Ave., Ft. Lauderdale,  
FL 33315

Hydroxli Systems, 9800 McDonald Park Rd, Sidney, BC V8L 3S8,  
Canada

Microphor, 452 E. Hill Rd., Willis, CA 95490  
Severn Trent Da Nora, LLC, 1110 Industrial Boulevard, Sugar  
Land, TX 77478

## SATELLITE COMMUNICATIONS

Eurocom Industries AB, Box 7071, DK-9200 Aalborg SV,  
Denmark

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

KVH Industries Inc., 50 Enterprise Center, Middletown , RI  
02842

Nera Satcom AS, Box 91, NO-1375 Billingstad, Norway  
Petrocom, 5300 West Sam Houston Parkway North, Houston,  
TX 77041

Stratos , Donovan Business Park, St. Johns, NL Canada A1C  
5X3, Canada

**Thrane & Thrane Inc., 509 Viking Dr. Suites K, L &  
M, Virginia Beach, VA 23452, 1-866-SATCOMS or  
+1-757-463-9557, +1-757-463-9581, writeus@tt.dk,  
Contact: Tom Kelly, www.tt.dk/us**

## SCARIFIERS

Desmond-Stephan, P.O. Box 30, Urbana, OH 43078

## SEALS

Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH  
44234

Orkot Composites, 2535 Prairie Rd, Unit D., Eugene, OR 97402  
Thordon Bearings, 3225 Mainway, Burlington Ontario L7M 1A6,  
Canada

## SEATING

H.O. Bostrom, 818 Progress Ave., Waukesha, WI 53186

## SECURITY

EMX, Inc., 4200 Dow Road, Suite C, Melbourne, FL 32934  
LSI Lockmaster Security, 1044 S. Main Street, Nicolasville, KY  
40356

## SENSORS

Electronic Marine Systems, 800 Ferndale Pl., Rahway, NJ  
07065

## SHAFT SEALS

Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH  
44234

LSI Lockmaster Security, 1044 S. Main Street, Nicolasville, KY  
40356

## SENSORS

Electronic Marine Systems, 800 Ferndale Pl., Rahway, NJ  
07065

## SHAFT SEALS

Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH  
44234

Thordon Bearings, 3225 Mainway, Burlington, Ontario L7M  
1A6, Canada

## SHAFTS

**Centa Corp., 815 Black Hawk Drive, Westmont, IL  
60559, 630-734-9600, 630-734-9669,  
bobl@centacorp.com**

Eurasia Group , 22A Floor Chinachem Exchange Sq., , 1 Hoi  
Wan St., Quarry Bay, Hong Kong

## SHIP REPAIR

HALIFAX SHIPYARD, 3099 BARRINGTON ST, HALIFAX, NS,  
Canada

Manitowoc Marine Group, 1600 Ely St., Marinette, WI 54143-  
2434

Mark Van Schaick BV, Nieuwe Waterwegstraat, 3115 HE  
Schiedam, Harbour 535/Port Of Rotterdam, Netherlands

OCEAN TECHNICAL SERVICES, MILITARY OCEAN  
TERMINAL BAYONNE UNIT #8-FOOT OF 32ND STREET,  
BAYONNE, NJ 07002

United Marine Enterprises Inc., P.O. Box 22077, Beaumont, TX  
77720

United Marine Enterprises Inc., P.O. Box 22077, Beaumont, TX  
77720

Kongsberg Maritime AS, PO Box 1009, 3194 Horten, Norway

**SHIPBUILDING-REPAIRS, MAINTENANCE,  
DRYDOCKING**

Atlantic Marine, Inc., P.O. Box 3202 , mobile, AL 36652  
Austal USA, 100 Dunlap Dr., Mobile, AL 36633

Blount Marine, 461 Water St., Warren, RI 02885

Bollinger Lockport & Larose, P.O.Box 250, Lockport, LA 70374

Curacao Drydock Co., Box 3012 , Willemstad, Curacao,  
Netherlands Antilles

Detyens Shipyards Inc., 1670 Drydock Ave., Bldg 236, North  
Charleston, SC 29450

Fincantieri Cantierieri Navali Italiani Spa, Merchant Shipbuilding  
Div., 34123 Trieste, Italy

In-Place Machining, 3811 N. Holton St., Milwaukee, WI 53212  
Leevac Industries, LLC, P.O. Box 1190, Jennings, LA 70546

Manitowoc Marine Group, 1600 Ely St., Marinette, WI 54143-2434  
Motor-Services AB, Box 2115 , Ronninge S- 144 04, Sweden

Newport News Shipbuilding, 4101 Washington Ave., Newport News  
, VA 23607

United Defense, 1525 Wilson Blvd., Ste 700, Arlington, VA 22209-  
2444

United Marine Enterprises Inc., P.O. Box 22077, Beaumont, TX  
77720

VT Halter, PO Box 3029, Gulfport, MS 39505  
Washburn Doughty, P.O. Box 296, E. Boothbay, ME 04544

## SHIPYARDS

Alabama Shipyard, P.O. Box 3202, Mobile, AL 36652  
Atlantic Marine, Inc., P.O. Box 3202, mobile, AL 36652

Derecktor Shipyard, 311 E. Boston Post Rd., Mamaroneck, NY  
10543

Detyens Shipyards Inc., 1670 Drydock Ave., Bldg 236, North  
Charleston, SC 29450

Leevac Industries, LLC, P.O. Box 1190, Jennings, LA 70546  
Offshore Inland, 3521 Brookdale Dr. S., Mobile, AL 36618

United Defense, 1525 Wilson Blvd., Ste 700, Arlington, VA  
22209-2444

## SIGNS & LABELS

# INFORMATION

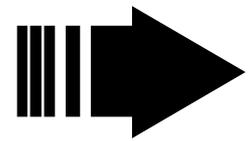
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#### TRAINING

Calhoon MEBA Engineering School, 27050 St. Michaels Road, Easton, MD 21601

**DM Consulting, 12316 Dormouse Road, San Diego, CA 92129, 858-705-0780, 858-538-5372, jstiglich@aol.com, Contact: Joe Stiglich, www.drydocktraining.com**

International Maritime Training, 910 SE 17th St., Ste 200, Fort Lauderdale, FL 33316  
LSI Lockmaster Security, 1044 S. Main Street, Nicholasville, KY 40356

#### TRAVEL SERVICES

Griffin Americas, 3648 Greenbriar Drive, Houston, TX 77098

#### TURBOCHARGERS

ABB Turbo Systems AG, CH 5401, Baden, Switzerland

#### TURBOCHARGERS- REPAIRS

Motor-Services Hugo Stamp, 3101 S.W. 3rd Ave., Ft. Lauderdale, FL 33315  
Napier Turbochargers, P.O. Box 1, Waterside, South Lincoln LN5 7FD, UK

#### ULTRASONIC TESTING

M.A.C.E, 5910 NE 15th Ave., Fort Lauderdale, FL 33331  
Panametrics-NDT, 18 Woerd Avenue, Waltham, MA 02453

#### UNDERWATER SURVEILLANCE SONAR

C-Tech LTD, P.O.Box 1960, Cornwall Ontario K6H6N7, Canada

#### VACUUM TOILET SYSTEM

Envirovac Inc, 1260 Turret Dr., Rockford, IL 61111  
Jets Vacuum Sewage System, P.O. Box 14, N-6060 Hareid, Norway

#### VALVE ACTUATORS

EIM Controls, 13840 Pike Road, Missouri City, TX 77489

#### VALVES & FITTINGS

Leslie Controls, 12501 Telecom Dr., Tampa, FL 33637

#### VENTILATION SYSTEMS / PRODUCTS

Delta T Systems, 858 West 13th Court, Riviera Beach, FL 33404

Dry Air Technology, 313 North Oak St., Burlington, VA 88233

#### VESSEL FINANCING

AIG Commercial Equipment Finance, Inc., 5700 Granite Parkway, Suite 850, Plano, TX 75024, 972-987-3708, 972-987-3700, kirk.phillips@aig.com

#### VIBRATION ANALYSIS

Ludeca, Inc., 1425 NW 88th Ave, Miami, FL 33172  
Maritech, LLC, 100 Powermill Rd., Acton, MA 01725

#### VISCOMETERS

Cambridge Applied System, 196 Boston Ave., Medford, MA 02155

#### VOYAGE DATA RECORDERS

Rutter Technologies Inc., 22 Pearl Place, P.O. BOX 427, St. John's NL A1C 5N8, Canada

#### WASTE WATER TREATMENT

RWO, Leerkampe 3, D-28259 Bremen, Germany  
Savern Trent Da Nora, LLC, 1110 Industrial Boulevard, Sugar Land, TX 77478

#### WATER JET CLEANING

Flow International Corp., 23500 64th Ave., South Kent, WA 98059

Gardner Denver Water Jetting Systems, 12300 N. Houston Rosslyn Road, Houston, TX 77086

#### WATER PURIFIERS

Alfa-Laval Separation, Inc., 955 Meams Rd., Warminster, PA 18974

Gardner Denver Water Jetting Systems, 12300 N. Houston Rosslyn Road, Houston, TX 77086

Offshore Marine Labs, 2000 West 135th St, Gardena, CA 90249

#### WATERTIGHT CLOSURES

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

#### WINCH MANUFACTURER

Burrard Iron Works Ltd., 220 Alexander Street, Vancouver, BC V6A 1C1, Canada, 604-684-2491, 604-684-0458, sales@burrardironworks.com

#### WINCHES & FAIRLEADS

Allied Systems, 2300 Oregon St., Sherwood, OR 64168  
Intercontinental Engineering, PO Box 9055, Kansas City, MO 64168

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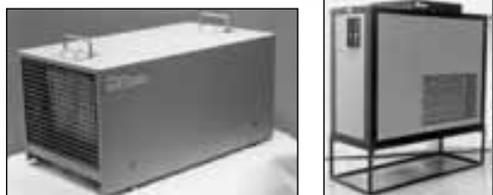
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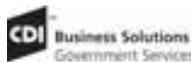
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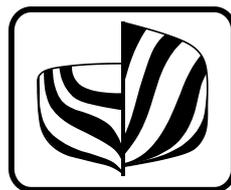
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