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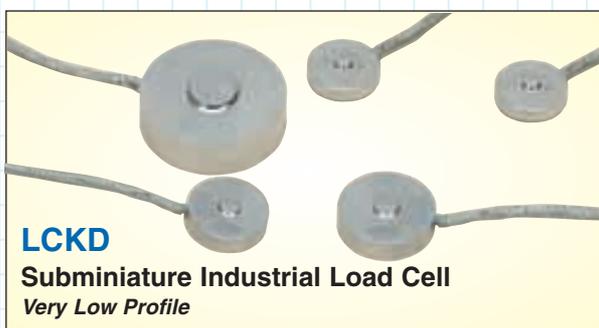
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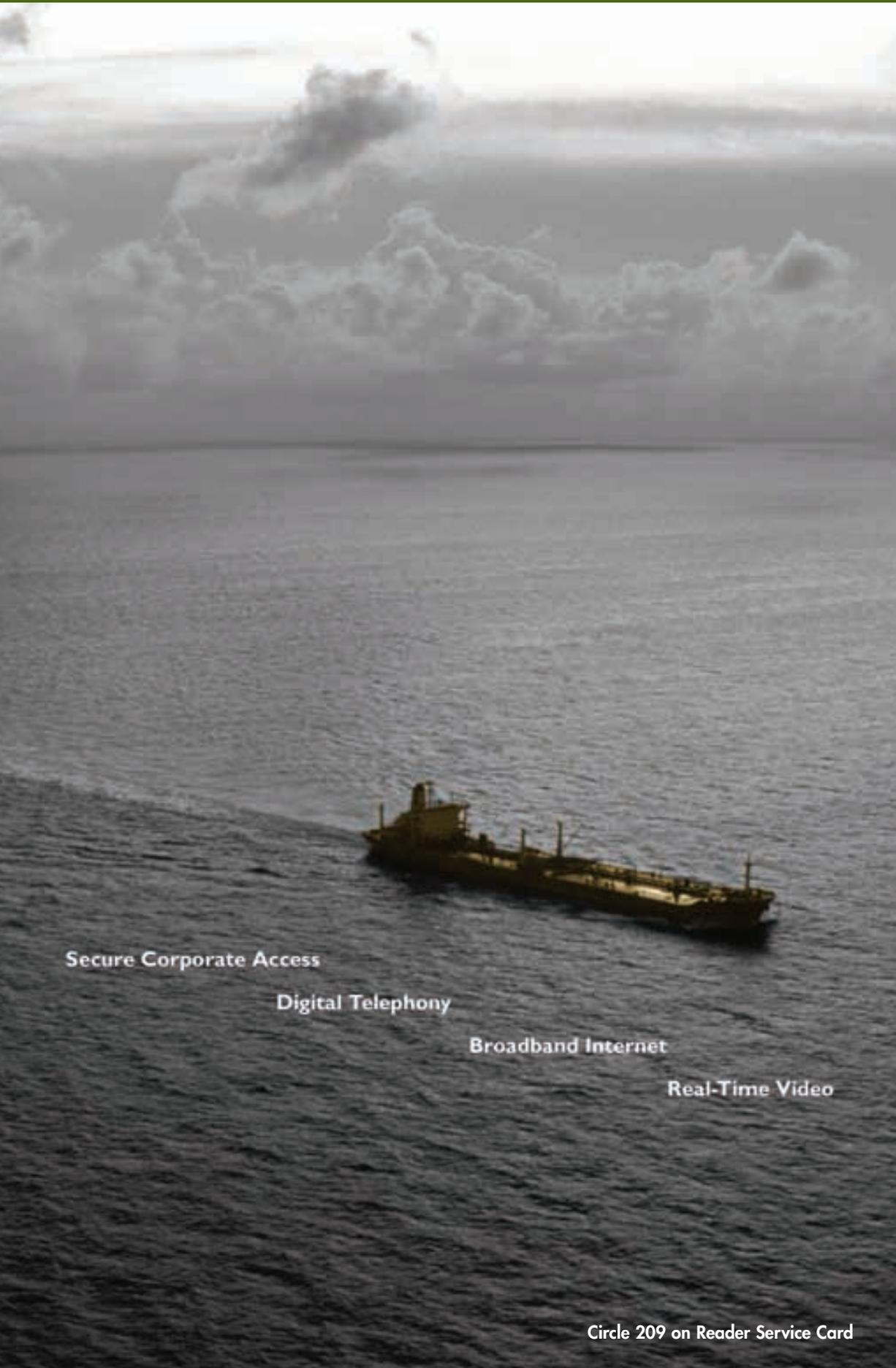


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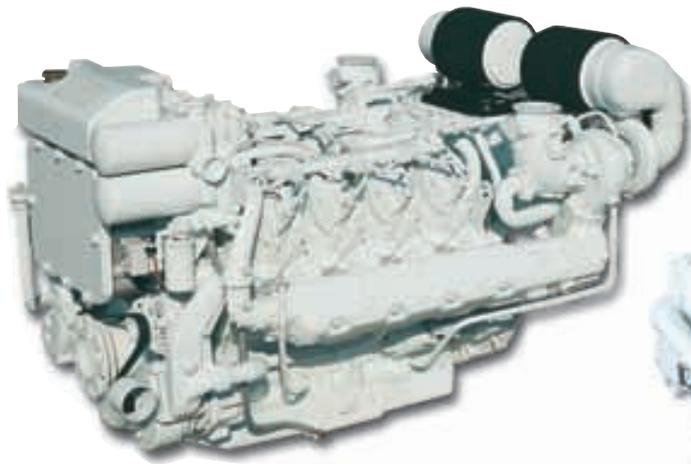
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## Shipyards May Raise Prices 5%

South Korea's seven shipbuilders, which delivered 38 percent of the world's vessels in 2005, said they may raise the prices of new ships by about five percent to take advantage of record orders and protect their profits from rising costs, according to a report from Bloomberg. The price of a supertanker that can hold 2 million barrels of oil rose 4 percent to about \$125 million in December, the Korea Shipbuilders Association said, citing Clarkson Plc. The price of a vessel that can carry 3,500 20-foot containers increased 2.8 percent to \$54 million from last year.

## Herzigova Godmother for Costa Concordia



Supermodel Eva Herzigova will be the godmother of the *Costa Concordia*, the new flagship of the Costa fleet, which will be christened on July 7 in the

Port of Rome (Civitavecchia). *Costa Concordia*, the largest cruise ship flying the Italian flag (112,000 gt and total guest capacity of 3,780), is set to become another Italian Made symbol: it was built in the historic Italian Fincantieri shipyards in Sestri Ponente (Genoa).

## Ship Launch Foiled by Hot Weather

Hot weather was the main reason that caused the hang-up of a 10,500 ton ship during its attempted launch at the Bach Dang Shipbuilding Industry Company in the northern port city of Haiphong on June 17. During the launch, the prow of the *Sun Island*, or *Noma 2*, touched the water but the remaining part of the vessel did not make it despite being tugged by another ship.

According to official explanation from a shipyard's engineer, the paraffin wax for lubrication on the slip-away had been melted due to the high outdoor temperature of over 42°C, leading to increasing friction during the launch and hampering the ship from entering

the water. (Source: [www.nhandan.com.vn](http://www.nhandan.com.vn))

## BC Ferries Gets \$68m for Sinking

BC Ferries received \$67.9 million in insurance compensation for the sinking of the *Queen of the North* earlier this year, [www.canada.com](http://www.canada.com) reported. The settlement was noted in the company's year-end financial details, in which net earnings increased \$14.7 million, or 2.6 per cent, over last year to \$49.9 million. The *Queen of the North* was traveling from Prince Rupert, B.C., to Port Hardy, B.C., when it rammed at full speed into Gil Island on March 22 and sank 400 m to the ocean's floor. (Source: [www.canada.com](http://www.canada.com))

## World's Largest Hovercraft Launched

White Young Green, (WYG) consultants to the built, natural and social environment's, specialist structures division based in Southampton were appointed by American company Hovertrans Incorporated in 2005 to design the largest hovercraft in the world. The Hoverbarge was designed



for use in Suriname in North Eastern South America where it is needed to facilitate oil exploration. The Hoverbarge is also able to carry 350 tons of exploration equipment at a speed of five knots over a variety of surfaces. The Hoverbarge is basically a large platform measuring 197 x 98 ft. (60 x 30 m) constructed of 21 steel boxes measuring 59 x 9.8 ft. (18 x 3 m).

## MMS: Gulf Oil Improving

An improvement has been made over the past month in oil and natural gas output in the Gulf of Mexico, which was interrupted last year when hurricanes Katrina and Rita damaged production platforms. Just over 15 percent of the normal daily oil production in the region is still blocked from market by platform shutdowns, compared with



21.6 percent on May 3, according to the Minerals Management Service, which manages federal offshore leases.

## Shipping Corporation of India to buy 35 ships

Government owned Shipping Corporation of India has said that they are planning to spend around \$1.4 billion on acquisition of 35 vessels in 2006/07. The company is now aiming on energy transportation for growth. They already own around 82 ships but most of them are bulk carriers and tankers. (Source: Techwhack)

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## Editor's Note

**W**hile backing out of my driveway, I smacked into another car. I've been driving for more than a quarter century with a clean record, and I consider myself to be reasonably careful and responsible, but nonetheless, I crumpled another man's door. Earth shattering? Not in the least. Painful? Only when my insurance rates come in. But it got me thinking about our industry, and the number of seemingly senseless accidents that occur. First, to be perfectly clear, I am a staunch defender of the marine market and its safety record. On the whole, considering the number of voyages made around the world on any given day, you are hard pressed to find a transportation segment with a better safety record. But there's always room for improvement.

I'm just back from the Posidonia exhibition in Greece, and having logged nearly 15 years covering this market, the pace of technological development and delivery never ceases to amaze me. There is a cadre of organizations which lead the charge in identifying and delivering next-generation ship and boat technologies, designed and built to save vessel owners time and money, to meet emerging regulations, or both.

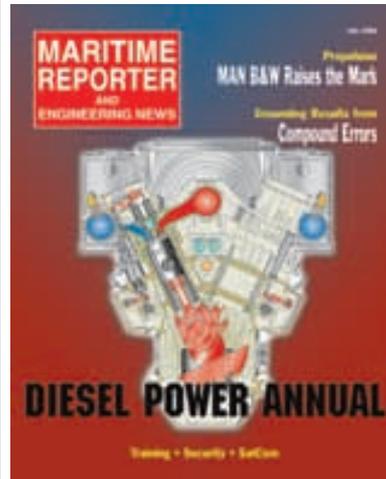
But while the rapidity with which new innovations are conjured is amazing, so too is the fact that, with an arsenal of safety and efficiency tools at the ready, ships continue to find peril, whether by an untimely meeting with an undersea object or with another ship. I realize that no matter the level of technological sophistication, accidents inevitably occur, whether by human error or mechanical failure. Yet it seems that with a renewed vigor towards updating vessels with safer and more efficient machinery and electronics, and a similar vigor towards ensuring that all crew are properly trained and educated, a large number of seemingly avoidable, costly accidents could be averted. Long time contributor Edward Lundquist weighs in on the matter, discussing a history of Navy groundings in a "Lessons Learned" format, starting on page 22.



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## On the Cover



**On the Cover:** Pictured on this month's cover is MAN B&W's 51/60 DF engine. The engine burns both gas and MDO (Marine Diesel Oil), and can also run long-term on pure HFO (Heavy Fuel Oil). In the marine realm it targets the burgeoning LNG market. Read about more MAN B&W developments on page 28.

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## ThyssenKrupp Marine Systems Wins Ship Order

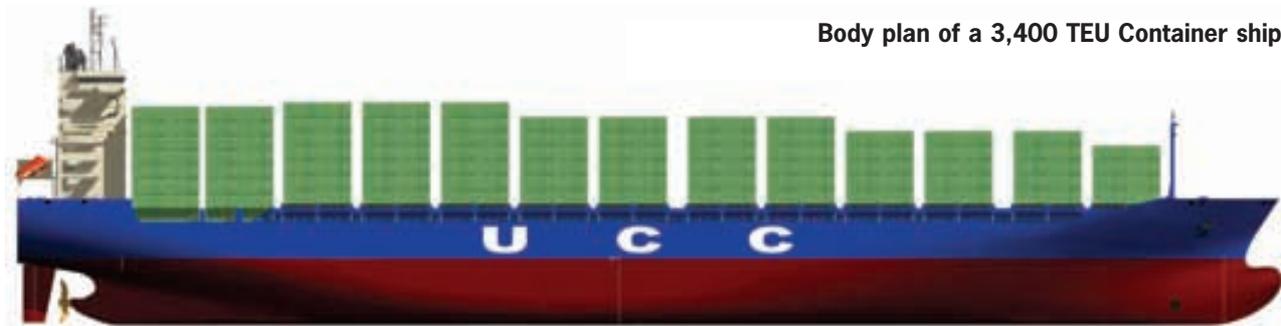
ThyssenKrupp Marine Systems won an order to build two 3,400 TEU containerships for Hartmann. These ships have a 3,400-teu capacity of will be built at the company's yard Nordseewerke in Emden. With this new order, the order books of the shipyard include five units of the 2,700 TEU class and four units of the new 3,400 TEU class. Together with the existing Navy orders, these orders guarantee a utilisation of the yard's production capacities until

the year 2009. The newbuildings no. 558 and 559 will be built according to German Lloyd regulations and feature the following main technical data:

<b>Length, o.a.</b>	<b>748 ft. (228 m)</b>
<b>Breadth, molded</b>	<b>105.6 ft. (32.2 m)</b>
<b>Moulded depth</b>	<b>60.8 ft. (18.5 m)</b>
<b>Carrying capacity approx.</b>	<b>42,250 tons</b>
<b>Container capacity</b>	<b>3,414 TEU</b>
<b>Main engine power</b>	<b>28,880 kW at 104 rpm</b>
<b>Service speed approx.</b>	<b>23.75 knots</b>

## Contract Signed for LNG Powered Ship

Statoil has awarded Eidesvik Shipping AS the contract for the delivery of a supply ship fuelled by liquefied natural gas (LNG). This is a Vik Sandvik 493 LNG-Avant ship of the same design as Viking Avant, which is already chartered by Statoil. The new ship is planned to transport supplies from Kristiansund to the Halten/Nordland area. "Statoil has two LNG-fuelled ships under existing contracts. They have performed to our full satisfaction, not least in terms of the environment. LNG-fuelled ships emit considerably less NOx and carbon dioxide than conventional diesel-powered ships," said Anne Therese Hestenes, senior vice president, operations support, in the Exploration & Production Norway business area. The emissions of nitrogen oxides (NOx) are expected to be cut by almost 90 percent, which represents 160 tons per year. This corresponds to the annual NOx emissions from 20,000 cars. The carbon emissions will be reduced by approximately 20 percent. The supply ship, which is under construction at the Westcon shipyard at Ølen in southwestern Norway, is scheduled to be delivered in the autumn of 2007. Another ship will be used during the construction of the LNG-fuelled ship.



Body plan of a 3,400 TEU Container ship.

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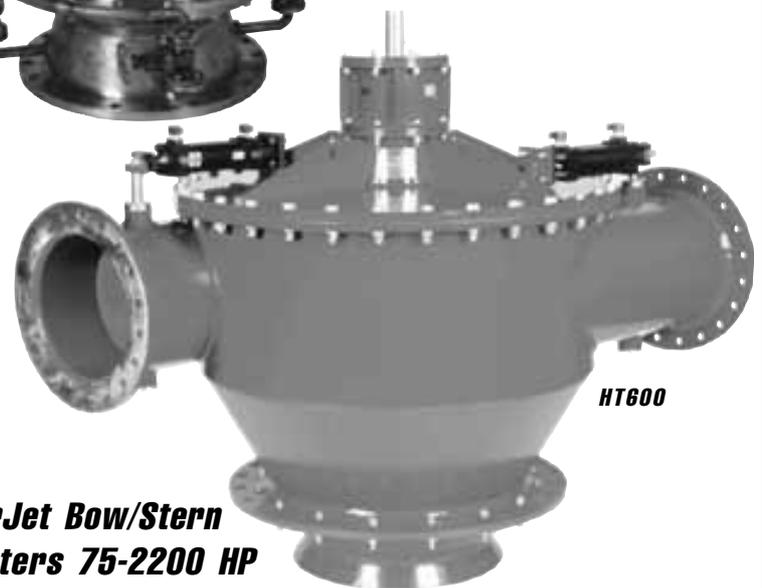
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# Lead Ship of T-AKE Class Delivered, Second Launched

General Dynamics NASSCO delivered the USNS Lewis and Clark (T-AKE 1) to the U.S. Navy. The ship is named after Captains Meriwether Lewis and William Clark, who led a legendary exploration of the American West from 1804 to 1806. USNS Lewis and Clark is the first of an expected class of 11 dry cargo-ammunition ships. With modular cargo holding and handling systems, the Lewis and Clark can replenish combat ships at sea with ammunition, food or fuel in one mission and then be quickly reconfigured for an alternate mission, such as a humanitarian sealift of supplies. The ship incorporates international marine technologies and commercial ship-design features, including an integrated electric-drive propulsion system, to minimize operating costs over its projected 40-year service life. Construction of the ship began in September 2003.

NASSCO also last month launched the USNS Sacagawea (T-AKE 2). Rep. Duncan Hunter (R-Calif.), chairman of the House Armed Services Committee, was the principal speaker for the ceremony. Two of Sacagawea's descendents, Lucy Diaz and Rachel Ariwite, both of Bingham County, Idaho, are the ship's sponsors and christened the ship during the twilight ceremony.

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### Lewis and Clark's Main Particulars

Length	689 ft. (210 m)
Displacement	40,945 metric tons
Speed	20 knots
Propulsion system	Diesel-Electric (35 MW)
Cargo capacity	6,675 mt of dry goods, 23,450 barrels of fuel 52,800 gal. of water
Crew	172



## Senate to Rumsfeld: The Navy Needs More Ships

On Friday, June 23, 2006, Senators Susan Collins (R-ME); Jack Reed (D-RI); Trent Lott (R-MS); Jim Talent (R-MO); Olympia Snowe (R-ME); Christopher Dodd (D-CT); Lincoln Chafee (R-RI); Mike Dewine (R-OH); Lindsey Graham (R-SC); Daniel Akaka (D-HI), David Vitter (R-LA); Frank Lautenberg (D-NJ); Bill Nelson (D-FL); Joe Lieberman (D-CT); Maria Cantwell (D-WA), and; Mary Landrieu (D-LA) sent a letter to Secretary of Defense, Donald H. Rumsfeld, asking him to increase the Navy's top line budget for the purpose of increasing the ship procurement budget in fiscal year 2008. The request comes on the heels of a letter sent by members of the House of Representatives Congressional Shipbuilding Caucus urging support for the Chief of Naval Operations (CNO), Adm. Michael C. Mullen, stated budget need of \$14.1 Billion for shipbuilding in FY '08.

The letter asked the Secretary of Defense to increase the Navy's budget from \$8.9 billion to \$14.1 billion to meet national security requirements that must be met by the Navy. Citing an overall Department of Defense (DOD) budget increase of over 50 percent since 2001, the Senators explicitly note that the ship procurement account has shrunk approximately 17 percent over the same time frame, resulting in a contraction of the Navy from 341 ships in 2001 to 280 today.

The Senators emphasize the necessity for a large blue water Navy capable of power projection to protect United States security interests across the globe. This emphasis on power projection follows the release of DOD reports quantifying the rapid expansion of China's Navy and estimates that China's Navy will be larger than the U.S. Navy by 2015.

## Marinette Marine Wins \$600m USCG Contract

The U.S. Coast Guard awarded the Response Boat-Medium production contract valued at approximately \$600 million to Marinette Marine Corporation of Marinette, Wis. Delivery of the first boat is expected in late 2007 and the Coast Guard expects to eventually purchase up to 180 boats over a period of up to eight years.

The Response Boat-Medium will replace the aging fleet of 41-ft. utility boats and assorted non-standard boats. The new boats will have increased maneuverability, the ability to mount light machine guns, and be capable of speeds in excess of 40 knots (46 mph) with twin high output inboard diesel engines. A full cabin will provide crew protection from the elements and be equipped with a robust navigation system, heating and air conditioning, shock mitigating seats and a communication system capable of communicating with other federal, state and local homeland security partners.

## Aker Yards to Build DSVs

Aker Yards has entered into a contract with DOF ASA for the building of one Diving Support Vessel (DSV), and a contract with DOFCON and Technip for a second DSV. Aker Yards is to build a 106 m Diving Support Vessel for DOF, based on an Aker Yards design; Aker DSV06. The Vessel is scheduled for delivery from Aker Yards, Sjøviknes in the spring of 2007. The vessel will be equipped with a 150-ton crane and all equipment necessary to support both IRM and subsea construction projects in the most challenging environments of the North Sea.

Aker Yards also will build and deliver a 502 ft. (153 m) Diving Support Vessel to a company owned by DOFCON and Technip, based on the Aker Yards design; Aker OSCV-06L DSV. The Vessel will be delivered from Aker Yards, Sjøviknes, and serve an

eight-year Charter Contract with Technip. It will be equipped with a diving system, a 300-ton crane, and a 24 man dive system.

## Qatar Orders LNG Carriers

Hyundai Heavy Industries Co. and two other South Korean shipbuilders said they won orders for 10 LNG carriers from Qatar Gas Transport totaling \$2.5b.

Hyundai Heavy will build three ships, which can each carry 216,000 cu. m. of LNG. Daewoo Shipbuilding, the world's second-largest shipbuilder, will build three vessels which can each move 210,100 cu. m. of LNG. Samsung Heavy will build three of the world's biggest ships, which can each carry 266,000 cu. m. of LNG, and one 217,000 cu. m. vessel.

## ABS Issues New Ice-Class Tanker Guidance

In response to a rising interest in ice-class tankers, driven in part by rising oil exports from Russia's Northern regions, and partly by a regulatory-driven accelerated phase-out of older ships will result in the ice class tanker fleet growing by 18 million dwt by 2008, ABS has developed a new comprehensive guide for vessels operating in the Arctic and comparable harsh environments.

The ABS Guide for Vessels Operating in Low Temperature Environments addresses the unique demands imposed on vessels operating in these regions. "The presence of first year and multi year ice imposes additional loads on the hull, propulsion system and appendages," said ABS' Vice President of Special Projects Kirsi Tikka. "However, low temperatures impact the ship in a multitude of other ways and the cold, lack of light and visibility affect the crew." The new guide is intended to be used in conjunction with the previously issued ABS Guidance Notes on Ice Class.

## Bollinger Delivers First of Four Tank Barges to K-Sea

Bollinger Marine Fabricators, LLC, (BMF) Amelia, La., a Bollinger Shipyards, Inc. company, has delivered the DBL 28, a double hull, oil tank barge built to meet the requirements of the Oil Pollution Act of 1990 (OPA'90), to K-Sea Transportation Partners L.P, Staten Island, N.Y. Following the delivery of the DBL 28, Bollinger announced the signing of four sister ships.

"Our BMF facility has had great success with K-Sea's barge building programs over the last several years. We recently expanded our capacity at the facility with hopes of including other types of vessels, but demand for our various classes of barges has taken up most all of the capacity," said Chris Bollinger, executive vice president new construction of Bollinger Shipyards. "K-Sea and Bollinger have worked very closely on the development of this 28,000 BBL class of barge. The signing of the additional four units confirms K-Sea's dedication and confidence in our workforce to deliver a superior barge that will play a key roll in their future."

The 28,000 bbl capacity DBL 28 measures 297.6 x 54 x 13-ft. DBL 28 is



**DBL 28, the first in a series of eight OPA'90 compliant, Lakes, Bays & Sounds, ABS and USCG certified tank barges delivered from Bollinger to K-Sea Transportation for use in harbor service in ports on the Northeast U. S. Coast.**

the first of a series of eight units currently in production at BMF for K-Sea. DBL 28 is coupled with an existing K-Sea tug using the Beacon JAK 200 tug/barge Push-Pin coupler system, which is designed to increase operating efficiency and enhance safety and reliability by operating as a dual mode ITB. The series of barges are manned, non self-propelled, double hulled with a raked shaped bow, with six cargo tanks. The barges are classed Lakes, Bays & Sound (Inland) Tank Barges, ABS +A1 Oil Tank Barge, and USCG certified. The barges are being constructed primarily for bunkering and harbor service in ports on the U.S. East Coast.

"With the delivery of the DBL 28 Bollinger has again demonstrated their ability to produce a high-quality barge that meets our precise scheduling and contract terms," Timothy J. Casey, President and CEO of K-Sea. "This new series of barges represents the next exciting step in our barge building program and we look forward to providing our customers with state-of-the-art double hull service in both the coastwise and local markets."

### Acergy Charters Heavy Construction Ship

Acergy S.A. entered into an agreement with DOFCON ASA for the char-

ter of the Skandi Acergy, a newbuild heavy construction ship.

The eight-year charter will commence upon delivery, which is scheduled for the second quarter of 2008. Construction is taking place at the Aker Sjøviknes Yard in Norway.

The new ship will be 502 ft. (153 m) long with a cargo deck area of 2,100 sq. m., and will be fitted with a heave compensated crane with 400-mt lift capability, a 3,000-ton under deck carousel and have Class 3 dynamic positioning. The ship will meet the latest environmental criteria, have a fast transit speed and will have an ice class hull enabling her to operate in the Barents Sea and Northern North Sea.

Bruno Chabas, Chief Operating Officer, said, "The charter of this new ship will give us greater flexibility of operations in the North Sea market and her high transit speed also makes her eminently suitable for the worldwide market. By entering into this charter, we continue to implement our strategy to rejuvenate our fleet, making it younger, more versatile and better suited for our client requirements."

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### Navy Awards Contract for Third LCS

The U.S. Navy awarded a \$197.6 million contract option to a team lead by Lockheed Martin for construction of the third Littoral Combat Ship (LCS). LCS 3 will be the second built by the Lockheed Martin team. "This contract award is a testament to the strong resolve of both the Navy and industry to get these highly capable ships into the water as quickly as possible," said Rear Adm. Charles Hamilton, the Navy's Program Executive Officer for Ships. "LCS will introduce unprecedented speed, agility and flexibility into the littoral battlespace. The rapid acquisition of these modular warships sets a new standard for procurement in support of the warfighter."

The Lockheed Martin team will begin construction of LCS 3 in January 2007 at Bollinger Shipyards in Lockport, La., and ship delivery is planned for 2009. It will later be homeported in San Diego, Calif., with the first two ships of the class.

Lockheed Martin Corp.'s Maritime Systems & Sensors unit, Moorestown, NJ, is the prime contractor. Teammates include Bollinger Shipyards, Lockport, LA, ship designer Gibbs & Cox, Arlington, Va., and Marinette Marine, Marinette, Wis., which is currently building LCS 1 Freedom.

Under a separate contract, General Dynamics is currently building LCS 2 Independence, with an option to build a second ship.

### Chem Spill Clean Up Protocol to Enter Force

The Protocol on Preparedness, Response and Cooperation to Pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol), 2000, has now achieved enough ratifications for entry into force on June 14, 2007, 12 months after its accession by Portugal, on June 14, 2006. The OPRC-HNS Protocol is aimed at providing a global framework for international co-operation in combating major incidents or threats of marine pollution from ships carrying hazardous and noxious substances (HNS), such as chemicals.

### LPD 17 Funds Awarded

Northrop Grumman Ship Systems, New Orleans, La., was awarded a \$2.49 billion fixed-price incentive contract for construction of two LPD 17 Class amphibious transport dock ships (LPD 22 and 23), with long lead time materials and associated labor for a third (LPD 24). In addition to ship production, this effort will include procurement of long lead material and also inspection, testing, storing and maintaining long lead material.

### Labroy Secures Contracts

Labroy Marine won four shipbuilding contracts worth \$54.3 million. The four vessels are an Anchor

Handling Tug Supply vessel, a multi-purpose maintenance vessel and two topside maintenance vessels.

### Keppel Wins Rig Order from India



Signing the contract for the fourth KFELS B Class jackup from India are Bharat K. Sheth, Deputy Chairman/MD, Great Eastern Shipping and Tong Chong Heong, MD/COO, Keppel O&M.

Keppel FELS won its fourth order from India for a \$182m KFELS B Class jackup rig, for the Great Eastern Shipping Co. Ltd. Group (G.E. Shipping). This will be G.E. Shipping's first newbuild drilling rig and is scheduled for delivery by the fourth quarter of 2009. The unit will be customized to meet G.E. Shipping's operational requirements for water depths of up to 350 ft. and readily upgradeable to 400 ft. The rig will have capabilities to drill in 30,000 feet water



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## EBDG Provides Support for Landing Craft

Elliott Bay Design Group (EBDG) has added two more landing craft vessel projects to its portfolio. The naval architecture and marine engineering firm delivered production support detail drawings for Kvichak Marine Industries' design of 10 MPF utility boats for the U.S. Navy. The 40-ft. high-speed landing craft are replacing the Navy's existing LCM-8 craft as part of its Improved Navy Lighterage System in support of the pre-positioned Marine Amphibious assault missions.

Because of the large number of identical boats being constructed, EBDG tailored its work package to support an assembly line production approach. EBDG delivered 3D isometric assembly drawings of all machinery and system components, pipes, and fittings to the builder in lieu of the more typical two-dimensional drawings; offering Kvichak a more realistic perspective of the parts involved and their assembly. Two vessels have already been built, with two more currently under production. All 10 craft are expected to be delivered by the end of 2006, with an option for more vessels in 2008.

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depth and can accommodate 112.

According to India's national oil company, Oil & Natural Gas Corporation Limited (ONGC), it aims to double E&P reserves to six billion tons by 2020, out of which four billion tons are from deep waters.

### Korean Navy Launches New Submarine

Hyundai Heavy Industries launched a new, \$350m submarine, the 214 class Sohn Won-il. The Shon Won-il accommodates a crew of 40, and the Navy plans to acquire nine submarines by around 2020.

### Cianbro to Convert Sulfur Tankers to Offshore Supply Ships

Cianbro won a contract from Hornbeck Offshore Services of Covington, La., to convert two 370-ft. sulfur tankers into multipurpose supply vessels for the offshore oil industry. Cianbro was scheduled to receive the first ship last month, with work on both vessels expected to continue through next year.

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When completed, it is believed that the two U.S.-flagged vessels will be the largest offshore supply ships in the world. Todd Hornbeck, chairman, president and CEO of Hornbeck Offshore Services, said the HOS 370s will be

unlike any vessels now working in the Gulf of Mexico. He said they are designed to have multiple Coast Guard certifications and will be able to support offshore construction, subsea well intervention, pipe hauling and floating hotel

services, among other capabilities.

### OSG to Time Charter Product Carriers

Overseas Shipholding signed agreements with subsidiaries of Cido Tanker

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## CMB Continues Fleet Rejuvenation

CMB confirmed that its subsidiary, Bocimar and Wah Kwong, have sold the Panamax vessel Yasmine Venture (2006 - 73,546 dwt) - ordered in joint venture in 2003 from Jiangnan (China) - to

Diana Shipping. The net sale price amounts to \$39.6 million. Also, Bocimar and Oak Maritime have concluded an agreement with Chang Myung Shipping (Korea) for the sale of the joint venture vessel Mineral Oak (1996 - 165,693 dwt). The net sale price is \$45.3

million. For CMB, this sale will generate a capital gain of approximately \$11.5 million, also expected for the third quarter. Finally, Bocimar has ordered a 177,000 dwt capesize vessel from SWS (Shanghai Waigaoqiao Shipyard - China). The purchase price amounts to

\$60 million and the delivery will take place in the fourth quarter of 2009.

## Navantia Starts Work on 8 Patrol Boats

The General Commander of the Bolivarian Republic of Venezuela, Admiral Armando Laguna, and the president of Navantia, Juan Pedro Gómez Jaén have signed in the facilities of Navantia in San Fernando and Puerto Real, the start of the construction works of eight patrol boats for Venezuela.

The order includes four oceanic patrol boats for vigilance of the economic exclusive zone, and four patrol boats for vigilance of the coast, designed both by Navantia for defense missions of the Venezuela sea and coasts. Construction be at the de San Fernando-Puerto Real shipyard.

## Odfjell Expands Fleet

Odfjell bought M/T Giada D from Italian owners. The vessel was built in 1996 at Chantiere Navale de Poli, Italy and is 10,115 dwt with stainless steel cargo tanks. The change of ownership will take place in 3Q 2006. Also, Odfjell entered into a long-term time-charter agreement with purchase option for a vessel of 33,000 dwt with stainless steel cargo tanks. The ship will be built at Kitanihon Shipyard, Japan, and will be owned by Yuyo Steamship Co. Ltd., Japan. Delivery of the newbuilding will be 3rd Quarter 2009.

## Aker Yards Delivers Missile Boat



A missile boat in the Hamina class - dubbed Pori and the last in the series of four built at Aker Yards, Rauma - was delivered to the Finnish Navy. The four vessels form the Navy's new Squadron 2000. The previous ones called Hamina, Tornio and Hanko were delivered in 1998, 2003 and 2005. The aluminum vessel measures 167.3 x 27.9 ft. (51 x 8.5 m) with a 5.8 ft. (1.7 m) draft and a displacement of 236 tons. Aluminum and lightweight composite materials are used in the superstructure. The propulsion system is two water jets, which give the vessel a speed of more than 30 knots.

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# Bourbon Christens Bourbon Orca

Bourbon Orca (Ulstein AX104) is an AHTS (Anchor Handling Tug Supply Vessel) and the latest of the modern offshore oil and gas marine service vessels christened in Aalesund, Norway. Bourbon Orca, scheduled to work under contract with Norsk Hydro, is the result of a collaboration between Bourbon Offshore, Ulstein Design and ODIM, which specializes in marine automated systems. Bourbon Orca offers the benefits of a revolutionary design with an inverted bow (the trademark Ulstein X-BOW). "Thinking outside the box is a credo at Ulstein Design, a credo that we work to translate into action. However, it is not enough to think new; we need to work with marine companies that are bold enough to dare to become involved and innovate with us. Bourbon Offshore Norway has shown us that it belongs to this group of pioneers, because it was immediately enthusiastic and participated with the completion of this innovative project," said Tore Ulstein, Chief Executive Officer of Ulstein Design A.S. This design is reported to improve the stability, fluidity and maneuverability of the vessel, allowing it to operate at higher cruising speeds under difficult

conditions. It substantially minimizes the pitching, slamming and vibrations of the running vessel.

When the vessel is in a dynamic position, the shape of the bottom limits the effects of eddies and banging. As a result, the Bourbon Orca will be able to operate under very difficult sea conditions, particularly in the North Sea.

"We were truly excited about the design of this vessel and the tank trials showed us that this hull offers exceptional advantages over traditional hulls," said Trond Myklebust, Managing Director of Bourbon Offshore Norway. "In addition to the fact that it reduces fuel consumption, this hull improves onboard comfort, offering the crews greater safety and rest."

In order to respect one of Bourbon's major commitments—to respect the environment, the Bourbon Orca is equipped with diesel-electric propulsion. This vessel will be the first AHTS to be equipped with this solution, combined with azimuth thrusters.

This technology, combined with the hull design, is said to significantly reduce gas and toxic emissions and ensure significant fuel savings. While

with a conventional propulsion system, the engines of an AHTS run continuously, with this type of propulsion, only the energy needed is consumed, generating both economic and environmental benefits. When discussing the commissioning of this new vessel, Christian Lefèvre, Deputy CEO of Bourbon and Managing Director of the Offshore Division, said: "Safety is a priority for Bourbon. With the Bourbon Orca, we are revolutionizing the standards for modern offshore oil and gas service vessels. This vessel offers better safety performance, but also better environmental performance and energy consumption, which gives Bourbon a real competitive advantage in the sector."

The ODIM system is a concrete implementation of the Bourbon QHSE (Quality, Health, Safety and Environment) system. From the beginning of this project, Bourbon Offshore Norway, strongly encouraged by the Statoil oil company, partnered with Ulstein and ODIM (a recognized hydraulic solutions supplier) in order to develop a solution to improve personnel safety on the after deck of the vessel. This collaboration produced the SAHS

System which eliminates any human presence on the after deck of the vessel during the most dangerous operations.

The after deck is equipped with two mobile cranes equipped with articulated grapples, a control system and a remote activated video surveillance system, as well as a mobile anchor handling platform system to replace the traditional stern roller. As a result, no member of the crew is on the after deck, which prevents any risk from handling equipment or a cable failure. "Everyone agrees that the risks are much too high in this type of operation; this is why we decided to change things with this vessel," said Myklebust. The SAHS system is the result of the highly technical study conducted at the local level by operators that are very much the leaders in the market. We were inspired by Statoil's invitation to develop safer anchor handling operations. As a result, in partnership with ODIM and Ulstein Design, we developed a radically different concept," he said. "We relied on the expertise and experience of captains, seamen, crane operators and platform managers and on the expertise of our partners."

**Circle 5 on Reader Service Card**



**Poor visibility in your satcom budget?**

# The McCalls: DP2 and Drilling Mud

When Hurricane Rita came ashore near Cameron, La., it virtually destroyed the town, including Seacor Marine's project manager Joe McCall's house. "We thought that it would come ashore over in Texas," recalled Joe, "So we had sent a bunch of the crewboats up into Lake Charles for shelter. But it came right down on them. They were all rafted up and came through it pretty well. The crews tend to be all up and alert for an event like that."

Like the Seacor crews in a hurricane, Joe McCall is alert full-time to trends and directions in the Gulf of Mexico crew boat market. His latest new build at Gulf Craft in Patterson, La., is typical of the annual advances that Joe and his dad Norman McCall seem to develop on a regular basis working with the design team at Gulfcraft headed up by Grant Pecoraro.

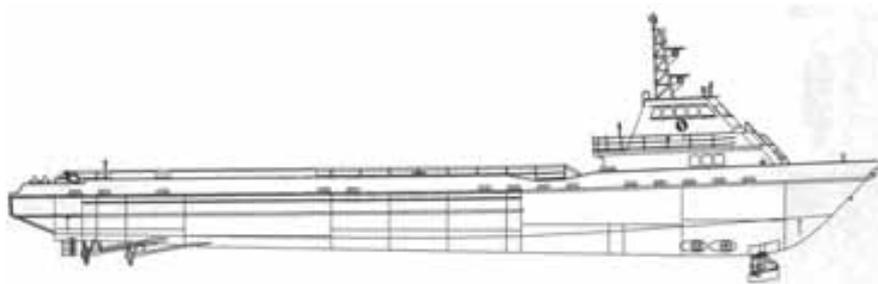
"Over the years we have worked with Gulf Craft to stay up to date with our customer's requirements," Joe said. He then went on to describe their latest innovation. The 190 x 35-ft. hull for the new boat had been turned right side up and was being completed in the water for a December 2006 delivery. As usual the specifications are driven by customer demand.

Rather than the usual set of water and fuel tankage, this boat will carry liquid drilling mud as well. In the past this has been carried in the displacement hulls of offshore supply vessels (OSVs). The new high-speed boat will not replace these OSVs, but it will be used to "top-up" supplies or to provide specialized drilling mud. With a capacity for 1,100 barrels in six tanks, each approximately 12 ft. square, the new boat will make 20 knots with a maximum load, and 26 knots running light.

This boat differs from Seacor's earlier drilling mud capable crew boats as those utilized deck tanks to carry only the dry powder for making mud. The liquid mud is considered an environmentally hazardous material. This drives the requirement for the new boat to be dynamic positioning two (DP2) equipped. To achieve a DP2 rating all propulsion and maneuvering components must be



Joe McCall, project manager for Seacor Marine.



redundant. For main propulsion the boat has five KTA50 M2 engines each rated for 1,800 hp at 1,900 rpm for a total output of 9,000 hp. With five 54 x 54-in. propellers and three independent rudders, redundancy is assured. The rudders are located behind the two outboard and the center engines. Should one of the outboard engines with a rudder fail, there would still be two ruddered engines for maneuvering. Similarly the boat has three bowthrusters - two tunnel and one azimuthing. Having two tunnel thrusters maintains power requirements while keeping the diameter small enough at 30 in. so that the thrusters will not come out of the water when maneuvering in 10-ft. seas. The boat will have four Cummins QSM11 engines, two powering 290 kW generator sets that will provide power for the ship and

power for the mud, fuel and rig water discharge pumps. The remaining two QSM11s will drive hydraulic pumps to provide power to the Thrustmaster bowthrusters. With one of these two dedicated to the 400-hp azimuthing thruster and the other to the twin 200-hp tunnel thrusters.

With redundancy assured the need for efficient maneuvering under the rigs is aided by Seacor's continued use of controllable speed propeller (CSP) technology from CSP Electronics L.L.C. This system, developed in conjunction with Cummins, CSP and Seacor, allows the props to turn at virtually any low rpm desired.

While the Cummins KTA50s idle at about 650 rpm the slowest prop rpm possible with the 2.9:1 reduction on the five Twin Disc MG-6858 gears would

be about 200 rpm, the technology in the CSP system allows the prop rotations to be slowed below that while the main engines maintain their efficient idle rate which reduces fuel consumption. All of this is tied in to the DP system so functions with minimal input from the vessel operator. A computer calculates thrust on each prop and to adjust maintain less than 50 percent load on any one to keep to DP2 requirements. In addition to controlling propeller speeds the computerized CSP system provides an integrated alarm system that feeds predetermined alarms directly to the company's shore based offices as well as the boat's wheelhouse. Joe McCall explained that this system is well proven having been installed in five Seacor boats to date.

Most drilling mud weighs about 16.5 pounds per gallon, but some mixes can weigh as much as 23 pounds per gallon. With 42 gallons per barrel and 1,100 barrels this is a lot of weight, and a large part of McCall's reasoning in adding a fifth engine on this boat. While the additional engine adds five knots to the vessel's speed it also contributes significantly to engine life as it allows each engine is working less.

In addition to the liquid mud the new boat will have capacity for 430 long tons of deck cargo, 24,880 gallons of rig water and 38,650 gallons of fuel. Although the market isn't currently demanding it, the mud tanks could also carry fuel. The under 200 ton, Subchapter L classed boat will have seating for up to 36 offshore workers.

"This boat is designed to meet specialized needs," McCall explained, "We will be supplementing the larger OSVs for topping up requirements or delivering specialized fluids."

When developments are designed to meet new or emerging markets in the crew boat world they are likely to be built at Gulf Craft for Seacor and under the watchful eye of Joe McCall.

While other companies are preparing vessels to transport liquid mud as well, the tradition of leadership that the McCalls have long delivered to Seacor remains.

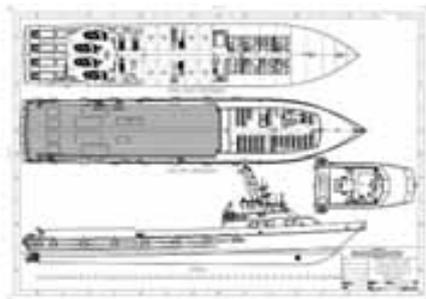
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## Penguin Marine Delivers

Penguin Shipyard International of Singapore delivered the 118 ft. (36 m) crew boat Bayou Tiram to a company of the same name of West Malaysia. With a molded beam of 24.9 ft. (7.6 m) the high-speed aluminum craft has a 57 x 18.4 ft. (17.4 x 5.6 m) open after deck affording 75.3 sq. m. of cargo space. Seating for 50 is provided in the main deck level of the cabin. Main engines for the boat are three KTA38 M2 engines each generating 1,350 hp at 1,900 rpm and turning 1200 x 1625 mm propellers through Twin Disc MG6848 marine gears. At sea trials the crew boat achieved a speed of 27 knots. Electrical needs are met by a pair of Cummins 6CXMTA8.3 - 99kW generators located in a separate space between the main engine room and the steering gear compartment. Tankage is built in for 48 tons of fuel and 24 tons of water. A motor driven bow thruster enhances slow speed maneuverability.



## Midship Marine Builds for Bourbon Offshore



In the first week of June the first of a series of crew boats building for Bourbon Offshore underwent sea trials. The vessel, to be foreign flagged, was built by Midship Marine Inc. of Louisiana. At 170 x 32 ft. with a molded depth of 13 ft., the boat has significant capacities. These include tankage for 34,500 gallons of fuel cargo, 30,000 gallons of rig water and 2,000 gallons of potable water. The boat's 109 x 29-ft. aft deck can handle up to 220 long tons of cargo. Accommodation is provided for an eight-person crew and seating is included for 80 offshore workers.

Propulsion power for the Bourbon Bora is provided by four Cummins KTA50 M2 engines each rated for 1,800 hp at 1,900 rpm for a total of 7,200 hp. The engines turn Hamilton 811 water

jets through reversible Reintjes gears. A pair of 99 kW Cummins/Onan generator sets provide ship's service power.

The DP1 equipped vessel is fitted with a 200 hp tunnel bow thruster and two fire fighting monitors.

## Container Carrier Christened

A container carrier - the first in a series of three - for Baltic Container Shipping was christened last month at Aker Yards shipyard in Rauma. The vessel to be managed by Rederi AB TransAtlantic was christened as TransPaper by Marjatta Härmälä, spouse of Stora Enso's President and CEO Jukka Härmälä.



The container carriers are intended to operate on the Gulf of Bothnia, between Kemi and Oulu in Finland, Gothenburg in Sweden and Lübeck in Germany. TransAtlantic and Stora Enso have a time charter agreement for the vessels to be carrying special SECU containers (Stora Enso Container Unit). The 13,800 dwt vessel is 625 ft. (190.5 m) long, 85.3 ft. (26 m) wide and can take 155 special sized containers. The propulsion machinery of each vessel consists of two medium speed diesel engines, and catalytic exhaust emission control is installed.

In order to meet the challenging heavy ice conditions during the wintertime, the vessels will be built to the highest ice classification, 1A Super.

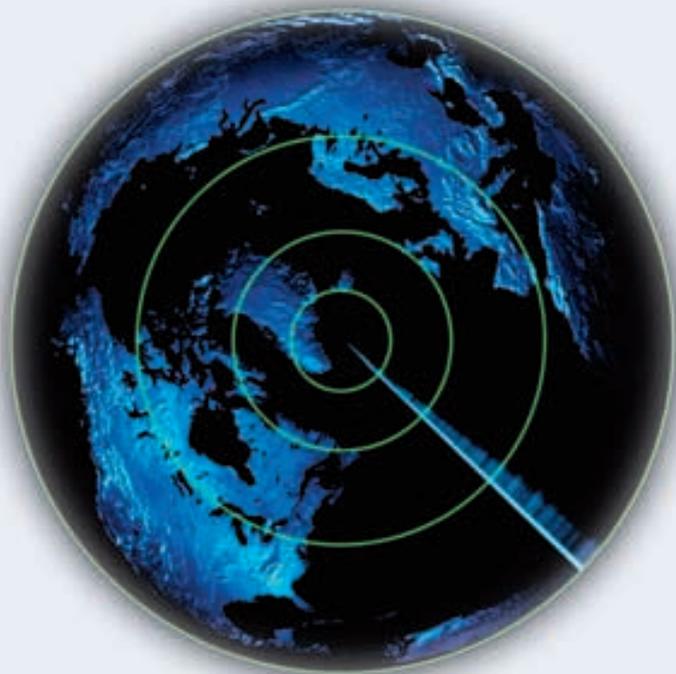
## "Tanker of the Future"

Concordia Maritime's Swedish-flagged product tanker Stena Primorsk, the third P-MAX tankers in a series of eight, was named last month. The total investment for the eight vessels amounts to \$325.5m. Stena Primorsk will transport mainly refined petroleum products on the Baltic Sea.

With its exceptionally wide hull, the vessel can transport about 30 percent more cargo than a conventional product tanker, and at practically no extra cost. Additionally, the vessel can transport both crude and refined oil and rapidly switch between the two types of cargo. In addition to having mandatory double hulls, the P-MAX tankers have been designed according to a new concept for safer oil transportation with double main engines in two completely separate engine rooms, double rudders and steering gear, two propellers and double control systems. All these double systems can be operated independently of each other, which results in safer oil transportation.

The Stena Paris and the Stena Provence have already been delivered, the Stena Primorsk together with yet another vessel will be delivered in 2006 and a further two will be delivered at the end of 2007/beginning of 2008. In addition, Concordia Maritime recently signed agreements with Brodosplit Shipyard for the construction of two P-MAX product tankers. These vessels — the Stena Progress and the Stena Prosperity — are expected to be delivered during the fourth quarter of 2009.

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# SeaWave&Rydex Debuts Regulatory Suite



Screenshot of SSAS operating over STAR vessel tracking system.

SeaWave&Rydex unveiled the SeaWave&Rydex Regulatory Suite, a collection of hardware and software products aimed at regulatory compliance for vessel and port security. The SeaWave&Rydex Regulatory Suite currently includes SSAS, eNOAD, and Notice to Mariners, all of which simplify the process to meet and exceed regulations using proprietary SeaWave&Rydex technology.

"The SeaWave&Rydex Regulatory

Suite simplifies the process of staying in compliance by utilizing proprietary technology which leverages SeaWave&Rydex software and hardware products," said Lawrence Zevon, technical product manager for SeaWave&Rydex. "Time saving features help significantly reduce administration and optimized data transmission further lowers the cost of meeting regulatory requirements."

SeaWave&Rydex SSAS (Ship

## SSAS

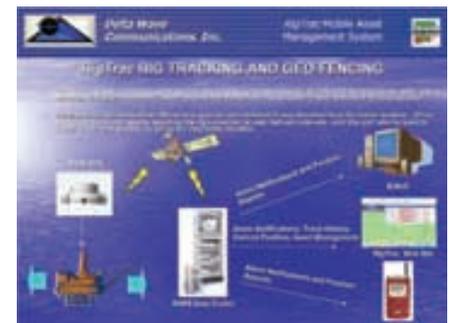


Security Alert System) designed to be an easy-to-use solution for global vessel security and is type approved for use with the newly introduced SeaWave Integrator 4. SeaWave&Rydex SSAS does not require external power, as it draws power from the Integrator via USB. It is configured and managed using a shore-based Web portal and purchase includes the main control unit and two alert buttons (up to four buttons can be supported). SeaWave&Rydex eNOAD (electronic notice of arrival and departure) is designed to simplify the reporting process by retaining previously entered information in its database, thereby eliminating duplication of effort. Crew and passenger records can be deactivated and reactivated when necessary and copied to other vessels. Likewise, previously filed notices can be copied to reduce data entry and tran-

scription errors. Information is sent via email using the Integrator, NavSeries or rmx2 software and any number of internal company recipients can receive a copy. eNOAD can also be installed in a shore-side office, whereby eNOAD reports can be submitted for a fleet of vessels, as the software is able to handle any number of ships.

Circle 9 on Reader Service Card

## Delta Wave Offers RigTrac



Delta Wave Communications launched the RigTrac system, which is designed to be a cost-effective solution for rig and asset tracking. While GPS tracking is nothing new, RigTrac offers a unique feature in that constant monitoring is not required until an asset moves from its designated location. Once out of its designated location, alerts are sent via SMS to cellular phones, email, as well as Delta Wave's dTrac on-line monitoring facility, which includes the GOM block chart. The RigTrac system is based on the Inmarsat constellation of satellites. The installation of the system does not require any special training and can be performed by rig personnel. A small shoebox sized device is installed onboard the rig with a clear line of sight to the horizon. Once the unit is powered up the GPS coordinates are captured by the RigTrac system. Those GPS coordinates are then used to geo-fence the rig. A geo-fence is a virtual boundary or fence set up around the rig. The RigTrac unit sends in a position report every morning to verify that it is within its geo-fence and working properly. If the rig moves outside of its assigned geo-fence, an alarm signal is sent. That signal is immediately relayed to dTrac. The alarm notification is then displayed on the website map and notifications of the geo-fence breach are additionally sent to e-mail addresses and cellular telephones if so desired. The RigTrac unit will continue to send position reports until the rig returns to its original position or is re-geo-fenced at a new position. The position report intervals can be increased or decreased at the customer's

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choosing. The standard report interval is one report per hour until the rig is back on location or re-geo-fenced at a new location. Another advantage of the system is tracking during rig moves. The rig operator may access dTrac and have the geo-fence disabled for rig moves. Then the rig will send a standard position report every hour during the rig move. Once the rig reaches the new site, the geo-fence is then activated. Lastly, the RigTrac system can be manually polled for an updated position at any time. This feature is very useful during both hurricanes and rig moves. The RigTrac unit has four I/O ports in order to accommodate different types of sensors for additional monitoring capabilities. Silent alarm switches may be added to upgrade the system to an SSAS system should such systems become required for MODU's.

### Seamobile Acquires MTN

SeaMobile, Inc. has acquired Maritime Telecommunications Network, Inc. (MTN), a provider of satellite-based broadband communications and networking services for the maritime industry. Terms of the agreement were not disclosed. "SeaMobile saw a strategic opportunity to combine the wireless and satellite expertise of the world's leading maritime communications companies to completely change the way travelers communicate at sea," said William D. Marks, CEO of SeaMobile. SeaMobile was founded in March 2005 to provide wireless voice, data, Internet and other content and communications related services for cruise lines, oil and gas platforms, ferries, yachts, container-ships, and government/military sectors. SeaMobile's

technology is an IP/software-based solution that works with any type of wireless phone (GSM, GPRS or CDMA) used by the customer when accessing the SeaMobile network at sea. This allows virtually anyone aboard any vessel at sea to use voice and data services available through their wireless home carrier, just as they would on land.

### Radio Holland Group Joins Imtech

Radio Holland Group B.V. and Imtech N.V. announced that the acquisition of Radio Holland Group is definitive. The acquisition has been approved by both the NMa (Dutch Competition Authority) and German Bundeskartellamt (German Federal Cartel Office). The acquisition will almost double revenues of Imtech in the maritime market. The acquisition price, including an earn-out, is approximately \$59m and will be paid in cash.

### Broadband for Cruise Ships

Grandi Navi Veloci, WINS and Maltasat International launched a satellite-based communications network on the first two of eight luxury cruise ferries that sail in the Western Mediterranean. The new network enables Grandi Navi Veloci to extend GSM telephony to passengers and crew at sea and also to provide broadband access services. The complete fleet of eight GNV ferries is expected to be equipped before the end of the year. Skylogic Italia is providing connectivity to and from vessels via its D-STAR satellite broadband product that connects to its teleport in Turin, Italy.

### France Telecom Debuts New Pricing for Connexion by Boeing

France Telecom Mobile Satellite Communications (FTMSC) announced two new pricing programs for Connexion by Boeing's maritime service offering to encourage commercial shipping companies to make the switch. "With these two new programs," said Ghani Behloul, vice president marketing & communications for FTMSC, "we believe we can offer customers what they really want—a choice in connectivity." The first is an evaluation program for those customers who wish to experience the service before making a long-term commitment. Under this program, customers can try the Connexion by Boeing high-speed Internet service for four months. This includes 2,000 minutes of data access, 100 minutes of voice, live global television (upon introduction in the fourth quarter) and access to the Connexion by Boeing online service management tools. At the end of the evaluation, customers can simply return the equipment or take advantage of financial incentives to convert to a standard service agreement. For those customers ready to commit a fleet to the high-speed, feature-rich Connexion by Boeing service, FTMSC offers a one-time promotional package where qualifying customers signing a standard service agreement for the service this year will receive a 30 percent discount off the regular monthly service fee through 2008. The Connexion by Boeing maritime service provides data rates up to 256 kbps from a vessel to the satellite and data rates of up to 5 mbps from the satellite to a vessel. The high-speed data rate allows multiple, simultaneous users to access the Internet, corporate intranet and email, as well as obtain additional information for vessel management such as weather, routing and port information.

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# Groundings Result from Compound Errors

**Technology helps, but you have to know how to use it**

Even the most sophisticated warship can find herself someplace she doesn't want to be: aground.

Professional mariners know that the consequences of grounding run from a minor delay in meeting the schedule to total destruction. Professional mariners also know that problems have a way of compounding themselves. The U.S. Navy's most serious grounding occurred in 1923 at Honda Point, Calif., when seven destroyers, operating at night in fog, followed one another onto the rocky coast (see related story next page). Some of those destroyers had the latest radio navigation systems. That was a long time ago, but there is a lesson for all of us, even today, that even with automated bridge systems and electronic navigation, warships and commercial vessels can make a series of errors that can lead to grounding. The common thread in all of these incidents is that these groundings could have been prevented.

Capt. Brian Boyce, USN (Ret.),

instructor navigation for Marine Safety International (MSI), in Norfolk, offers some lessons on groundings that somebody learned the hard way. Many of the mistakes that resulted in groundings are common threads in multiple incidents. And while these incidents apply to naval vessels, they are germane to seafarers everywhere. A guided missile frigate (FFG) was entering Ponce, Puerto Rico, in 1996. The commanding officer (CO) deferred to the pilot's advice, but the ship found herself outside the channel. The navigation team's plot held the ship outside the channel and warned the CO and the conning officer. The pilot disagreed with the warnings from the navigator and the team in Combat Information Center (CIC), and did not follow their recommendations to get back into the channel until it was too late. The subsequent investigation found that the pilot was fatigued. But the report also noted that the ship was able to determine that it was outside the channel - despite the sharp disagreement

of the pilot - and did not take timely appropriate action.

**Lessons learned: Complacency, and expecting things to go well and being unprepared for when they don't is one common thread. There is a failure to recognize that an error chain is developing. The failure to react to early clues and slow or stop the ship is another common thread.**

A recently commissioned guided-missile destroyer DDG was completing a port visit in 1996 at St. Maarten in the Netherlands Antilles following Combat Systems Qualification Testing (CSQT) Type Training in the Puerto Rican Operation Area. The navigation brief was held early on a Sunday morning, and was not conducted professionally. Last-minute changes to the watch bill resulted in key members of the navigation detail who had not attended the brief. The charts used were not up to date. Throughout the process, CIC was not engaged and did not offer recom-



Edward Lundquist is a senior science advisor and naval analyst with Alion Science and Technology, Washington, D.C.

mendations. Although it appeared that the ship had a safe track planned for departure from the anchorage, once underway, they found their desired course was blocked by an inbound cruise ship. The CO improvised a new departure plan, but failed to involve the key team members (Conn, Nav, CIC) on the new plan. No one had the same vision as to what the new plan was. As they drove south to cross the bow of the inbound cruise ship, the conning officer was preparing to come right to pass the inbound ship starboard to starboard when the navigator recommended com-





ing left to avoid shoal water (a reef) off the starboard bow. Once in extremis, the ship failed to take immediate action. After a short (but very costly) delay, the ship decided to come left, but they turned too little too late. Ten minutes after getting underway from her anchorage, the DDG ran aground on Proselyte Reef. Proximate causes were lack of situational awareness with respect to the well-charted reef, failure to use the whole team, and poor planning. This was compounded by the late departure and need for hurry to make their next event. It took \$10 million and nine months to repair the ship.

**Lessons learned: The ship's team did not react to very significant error chain clues. Also, they did not have a slow-and-stop abort plan.**

An FFG grounded off Alexandria, Egypt, in 1999. Although the Port Directory was specific in directing where to meet the pilot, the ship did not follow the stipulation and proceeded into port prematurely. It was late in the day and they were probably anxious to

get into port. Once in the narrow channel, the FFG encountered an outbound Navy CG. This forced the FFG to turn to seaward and head back out. After the CG cleared, the FFG again attempted to enter the channel but were directed by the port authority to return to sea. This time, the conning officer miscalculated his position and against the navigator's strong recommendation, he turned the ship into danger and the FFG ran aground.

**Lessons learned: Poor planning, lack of teamwork, fatigue and confusion caused this incident.**

A U.S. Navy amphibious ship (LST) taking part in the UNITAS 2000 exercises with South and Central American navies, and was preparing for a pre-dawn amphibious landing exercise when she ran up onto the rocky bottom. The 522-foot ship, carrying 240 Marines and their equipment, was operating in darkness and fog. It was getting ready to deliver eight vehicles to the beach, when it hit a reef, opening up a 40-foot long hole. No one was injured,

but the ship was declared a total loss, stripped, used as a gunnery target and sunk. The ship was using the Global Positioning Satellite (GPS) for navigational fixes, but was plotting them on Chilean charts.

**Lessons learned: GPS uses a point at the Earth's center as a datum, but the Chilean charts used a point on a promontory of land. The difference was disastrous.**

An amphibious transport (LPD) grounded in the Suez Canal in 2000. The LPD was anchored in Great Bitter Lake and was preparing to depart for northbound transit of the waterway. The ship had a safe plan but when the pilot boarded, the plan was changed to one that would save some time and distance. The original plan had the advantage of operating inside the well-marked channel; the new plan was well outside the channel and relied on reference to a small number of buoys marking the general anchorage area. Except for buoys, the area is featureless. As the ship transited north, they lost situational aware-

ness and when attempting to enter the main channel grounded outside of it.

**Lessons learned: The basic cause here was failure to craft a safe plan when the pilot asked for a change or failure to adhere to the old plan.**

"Quite often when we review the circumstances of a grounding it is apparent that one or more members of the team recognized that the ship was standing into danger," says retired Capt. Jim Barber, author of *Naval Shiphandler's Guide*, published by the Naval Institute Press. "Yet through timidity, failure to communicate clearly, or because their warning was ignored the ship went aground. Any discrepancy between navigation teams must be immediately addressed and resolved without the ship proceeding further into possible danger." No one source of information is infallible, and no individual is immune to error, Barber says. "Thus for critical matters such as navigation in restricted waters we rely on multiple teams and multiple sensors. Three teams, the conning party, the Navigator and his assis-

## Destroyers End up on the Rocks: One Mistake Follows Another

The Navy's greatest navigational tragedy took place in September 1923 at an isolated California coastal headland known as Honda Point. Officially called Point Pedernales, Honda Point was not far from the busy Santa Barbara Channel. Thirteen destroyers of Destroyer Squadron (DesRon) 11 departed San Francisco for a two-day cruise to San Diego. The squadron comprised the five ships of Destroyer Division (DesDiv) 33, led by Delphy (DD-261), followed by S.P. Lee (DD-310), Young (DD-312), Woodbury (DD-309) and Nicholas (DD-311); six ships from DesDiv 31, with Farragut (DD-300) followed by Fuller (DD-297), Percival (DD-298), Somers (DD-301), Chauncy (DD-296) and Kennedy (DD-306); and three ships from DesDiv 32, Paul Hamilton (DD-307), Stoddert (DD-302) and Thompson (DD-305).

The ships formed a column on the squadron leader Delphy. The flagship broadcast an erroneous report--based on an improperly interpreted radio compass bearing--showing the squadrons position about nine miles off Point Arguello. From that position the ships plotted a dead reckoning course. An hour later, the destroyers turned east to enter what they believed was the Santa Barbara Channel, though it could not be seen because of thick fog. Unusually strong current complicated the navigational situation. When Delphy turned, the other ships followed, but they were not where they thought they were, and seven of them ran aground along the rocky coast.

There were eight hundred officers and men on those ships, but only twenty-three lives were lost. All seven vessels: the Delphy, S.P. Lee, Young, Woodbury, Nicholas, Fuller and Chauncey were declared total wrecks. The ships were employing a new radio compass system. The system was working, but the bearings received were misinterpreted. The official investigation said the groundings were attributable to "bad errors in judgment and faulty navigation." In an endorsement to the record of the court of inquiry, the Chief of the Bureau of Engineering said: "The Bureau desires to emphasize the fact that such devices as radio compasses, sonic depth finders, etc., are reliable only to the extent that they are operated properly, and recommends that the attention of the forces afloat be directed to the necessity for continuous training in their use."

# A Standard Point of Reference

By Robert Freeman,  
Office of the Navigator of the Navy

Since antiquity, mapmakers have struggled with the problem of representing a bumpy, ellipsoid (the earth) on a flat, rectangular surface (the map). To do this requires some compromise in the relative position of individual points to each other. Historically, mapmakers have picked a point of interest to them to be the center of their depiction, and placed various features in their relative position to that point. For instance, an early English mapmaker might have chosen to place England at the center of his chart. More than just having personal appeal, this makes sense in terms of accuracy, since the farther one is from the reference point, generally, the less accurate the depiction. This was fine for giving a general depiction of landmasses and water bodies. By laying a coordinate system (longitude and latitude, for example) over the geographical features, you could provide a frame of reference that could be shared by other users. But maps based on different central points could differ radically in the coordinate position of a location away from those centers.

In the modern world of interoperability and precision positioning, this problem is greatly amplified. The solution is to reference each chart and map to a "datum."

A datum is a mathematical model of the shape of the earth used as a basic reference to calculate position coordinates, heights, and distances, as well as to make maps and charts. The datum defines the point from which all positions are refer-

enced. For example, the WGS 84 point of origin is the center of the earth's mass, as measured by the 1984 World Geodetic Survey (hence WGS 84). The North American Datum, NAD 27, is referenced to a ranch in Kansas, considered to be the approximate center of the continental United States. For the Tokyo datum, all points are referenced to the center of Tokyo. There are literally hundreds of datums in use. The DOD standard datum is WGS 84, and this is the one to which GPS defaults, but there is no "world standard datum." GPS gives positions based on WGS 84, so a position plotted on a chart using a different datum could differ by as much as a half mile with respect to ports, and up to two miles with respect to isolated islands! Several ships have run aground due to a poor understanding of datums!

and communications among all the key team members must be effective." Ships have access to new and better technology, but they also need the best available training on how to use it, says Boyce. Barber agrees. "GPS is so convenient and usually so accurate that there is a strong temptation to rely upon it to the virtual exclusion of other sensors. This is a mistake. We need to habitually compare GPS results with all other sensors, particularly including fathometer, radar, and visual." Retired Rear Admiral Dave Ramsey says that responsibility for collisions must often be placed above the ship-board level. "Senior leadership needs to

take an interest in what's happening. We need to get the right technology on our ships, and we need to make sure our people know how to use it. For example, there's no standard fleet course that teaches Automated Radar Plotting Aides. We still have Navy people who don't know how to use it."

"In the commercial world the causes of groundings show similar error chains," says MSI's Ed Lynch. "Complacency or fatigue on the part of the pilot and the bridge team not taking charge early enough. The bridge team does not give the pilot the assistance requested or he does not ask for their assistance or ignores the info provided."

Planning and anticipation are important. Says Barber, "We must think through in advance how to react to potential problems. What if we have an engine or rudder malfunction? In what direction is deep water? Where are the shoals and narrow places in the channel? Current? Ship traffic? Danger bearings? The ship control party must be prepared to react appropriately to any emergency." In unfamiliar waters a written plan and a carefully considered track are particularly important, Barber says. "Any requirement to deviate from the plan is a red flag and needs prudent evaluation. Saving a few minutes at the price of a riskier transit is almost never justified."

prizes in largest prize value of Revolutionary War. 1792 - John Paul Jones dies in Paris, France 1966 - Launch of Gemini 10 with LCDR John W. Young, USN as Command Pilot. Mission involved 43 orbits at an altitude of 412.2 nautical miles and lasted 2 days, 22 hours, and 46 minutes. 1973 - Task Force 78, Mine Countermeasures Force, departs waters of North Vietnam after completing their minesweeping operations of 1,992 tow hours for the cost of \$20,394,000. July 19, 1886 - Atlanta, the first steel-hulled American cruiser armed with breechloading rifled guns, is commissioned. 1897 - LT Robert E. Peary departs on year long Arctic Expedition which makes many important discoveries, including one of largest meteorites, Cape York. 1918 - Armored cruiser USS San Diego sunk off Fire Island, NY by a mine laid by U-156. July 20, 1960 - In first launch of Polaris missile, USS George Washington (SSBN 598) successfully fires 2 operational Polaris missiles while submerged off Florida. 1964 - Four Navy divers enter Project SEALAB I capsule moored 192 feet on the ocean floor off Bermuda for 11 day experiment. 1969 - Former Navy pilot Neil Armstrong is first man to set foot on the moon. While taking the first step, he said, "That's one small step for man, one giant leap for mankind." Armstrong was Commander of Apollo 11 which during its 8 day mission landed on the Sea of Tranquility. July 21, 1823 - After pirate attack, LT David G. Farragut leads landing party to destroy pirate stronghold in Cuba. 1946 - In first U.S. test of adaptability of jet aircraft to shipboard operations, XF-1 Phantom makes landings and takeoffs without catapults from Franklin D. Roosevelt. July 22, 1905 - Body of John Paul Jones moved to Annapolis, MD for reburial. 1964 - Four Navy Divers (LCDR Robert Thompson, MC; Gunners Mate First Class Lester Anderson, Chief Quartermaster Robert A. Barth, and Chief Hospital Corpsman Sanders Manning) submerge in Sealab I for 10 days at a depth of 192 feet, 39 miles off Hamilton, Bermuda. They surfaced on 31 July 1964. July 23, 1947 - First Navy all jet squadron (VF-17A) receives its first aircraft (FH).

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This problem becomes more critical when the subject is targeting. During the military action in Lebanon in 1983, Marine Corps spotters ashore were directing the naval gunfire from a battleship. Unfortunately, the ship was using WGS 72 coordinates, while the Marines were using European Datum coordinates. The target was missed and shells landed uncomfortably close to friendly forces. Fortunately, there were no casualties! Until a world standard datum is adopted, the solution to this problem must reside in training. And while algorithms exist for translating from one datum to another, this is no substitute for understanding. GPS is a wonderful innovation for navigation, providing instantaneous, real-time fixes at an accuracy that far exceeds conventional methods.

But navigators must be aware of its limitations and understand how to compensate when using charts based on other datums.

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## This Day in Navy History

July 1, 1797 - Naval Regulations passed by Congress 1850 - Naval School at Annapolis renamed Naval Academy 1911 - Trial of first Navy aircraft, Curtiss A-1. The designer, Glenn Curtiss, makes first flight in Navy's first aircraft, A-1, at Lake Keuka, NY, then prepares LT Theodore G. Ellyson, the first naval aviator, for his two solo flights in A-1. 1918 - USS Covington hit without warning by two torpedoes from German Submarine U-86 and sank the next day 1972 - Date of rank of Rear Admiral Samuel Lee Gravely, Jr., who was first U.S. Navy Admiral of African-American descent. July 2, 1923 - Commissioning of Naval Research Laboratory, Washington, DC. 1945 - USS Barb (SS-220) bombards Japanese installations on Kaiyo Island, Japan; first successful use of rockets against shore positions. July 3, 1898 - At Battle of Santiago, Cuba, RADM Sampson's squadron destroys Spanish fleet July 4, 1776 - American colonies declare their independence from Great Britain 1777 - John Paul Jones hoists first Stars and Stripes flag on Ranger at Portsmouth, NH. 1842 - First test of electrically operated underwater torpedo sinks gunboat Boxer July 6, 1747 - Birth of John Paul Jones at Arbigland, Scotland. 1908 - CDR Robert Peary sails in Roosevelt from New York to explore Arctic. 1911 - First naval aviation base established at Annapolis, MD. 1976 - 1st women enter Naval Academy. July 7, 1798 - Congress rescinds treaties with France; Quasi War begins with Frigate Delaware capturing French privateer, Croyable. 1846 - Commodore John D. Sloat lands at Monterey and claims California for U.S. 1916 - Thomas A. Edison becomes head of Naval Consulting Board which screens inventions for use by the Navy July 8, 1853 - Commodore Matthew C. Perry sails his squadron into Tokyo Bay.

July 9, 1918 - Henry Ford launches first of 100 Eagle boats. July 10, 1934 - USS Houston takes Franklin Delano Roosevelt on first visit of U.S. President to South America. 1943 - Naval gunfire help Allied troops land on Sicily. It was first extensive use of LST's and smaller landing craft to deliver heavy equipment over the beach. July 12, 1836 - Commissioning of Charles H. Haswell as first regularly appointed Engineer Officer. 1916 - North Carolina is first Navy ship to carry and operate aircraft 1988 - SECDEF approves opening Navy's Underwater Construction Teams, fleet oiler, ammunition ships, and combat stores ships to women. 1990 - Commander Rosemary B. Mariner becomes first woman to command an operational aviation squadron (VAQ-34). July 13, 1939 - Appointment of RADM Richard Byrd as commanding officer of 1939-1941 Antarctic Expedition. July 14, 1813 - LT John M. Gamble, the first marine to command a ship in battle (prize vessel Greenwich in capture of British whaler Seringapatam) 1952 - Laying of keel of USS Forrestal, the first 59,900 ton aircraft carrier. July 15, 1942 - First photographic interpretation unit set up in the Pacific. July 16, 1862 - Congress creates rank of Rear Admiral. David G. Farragut is named the first Rear Admiral 1912 - Rear Admiral Bradley Fiske receives patent for torpedo plane or airborne torpedo. 1915 - First Navy ships, battleships Ohio, Missouri, and Wisconsin transit Panama Canal. July 17, 1858 - U.S. sloop Niagara departs Queenstown, Ireland, to assist in laying first trans-Atlantic telegraph cable. 1975 - Docking in space of the U.S. Apollo (Apollo 18) and Soviet Soyuz (Soyuz 19) space craft. This was the first manned space flight conducted jointly by the 2 nations. Former naval aviator Vance D. Brand was the Apollo Command Module Pilot. July 18, 1775 - Continental Congress resolves that each colony provide armed vessels 1779 - Commodore Abraham Whipple's squadron captures 11

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# Canada Announces \$2.9B Navy Contract Bid

The Canadian shipbuilding industry received the prospects of an infusion of business courtesy of its government, which late last month announced plans to put out for bid an estimated \$2.9 billion contract to build and support three new joint support ships to the Canadian Forces.

Four consortia, including Irving Shipbuilding; BAE Systems (Project) Limited (BAE Systems Naval Ships); ThyssenKrupp Marine Systems AG; and SNC-Lavalin Profac Inc. are reportedly on the short list to bid on the project definition phase - including preliminary ship design, project implementation plans, and an in-service support plan. While it is anticipated that the ships will be built in Canada, design, engineering and weapons system work is expected to be supplied from outside organizations.

According to published reports, two groups will then be awarded contracts worth \$12.5 million each for the project definition phase, and will compete for the final implementation contract. Based on the definition phase plans, one consortium will be chosen to build the ships.

The \$2.9 billion price tag includes a base cost of \$2.1 billion, plus an estimated \$800 million in contracted in-service support over 20 years.

As has been the trend in the construction of modern foreign navies, particularly that of the U.S. Navy, the three new ships will replace two supply ships - the 35-year-old replenishment ships HMCS Protecteur and HMCS Preserver - and will be multi-mission, designed to have a much-expanded military role that goes far beyond re-supply duties. Preliminary information indicates that the vessels will include basic defense capabilities, and support for helicopters. The vessel will measure roughly 656 ft. (200 m) long and will displace about 28,000 metric tons. They must also be able to navigate first-year Arctic ice up to 0.7 m thick.

## Canada Donates to IMO Maritime Security Fund

The Honourable Lawrence Cannon, Minister of Transport, Infrastructure and Communities, together with the Honourable Peter MacKay, Minister of Foreign Affairs and Minister responsible for the Atlantic Canada Opportunities Agency, announced the Government of Canada is contributing \$500,000 to the International Maritime Organization's International Maritime Security Trust Fund. Canada's contribu-

tion is the largest contribution ever made to the fund by a single member state. "Our marine security program meets or exceeds international standards and ranks among the best in the world," said Minister Cannon. "This contribution of funds to international counter-terrorism efforts builds on our excellent relationship with the International Maritime Organization, and we look forward to working in collaboration with our international partners to further enhance marine security."

The International Maritime Security Trust Fund helps developing states meet international maritime security standards set by the International Maritime Organization, an agency of the United Nations. Canada's contribution to this fund will assist contracting states in

implementing the requirements mandated under the International Ship and Port Facility Security (ISPS) code.

"Canada plays a leadership role in maritime security worldwide," said Minister MacKay. "This contribution to the International Maritime Security Trust Fund demonstrates the Government of Canada's commitment to fighting terrorism and strengthening security around the world."

Contributing to the International Maritime Security Trust Fund is one of many steps that the Government of Canada is taking to enhance security. Budget 2006 recently announced \$1.4 billion to enhance national security, including more than \$250 million to continue to improve transportation security in Canada.

## Transport Canada Boosts Port Security

The Honourable Lawrence Cannon, Minister of Transport, Infrastructure and Communities, announced proposed amendments to the Marine Transportation Security Regulations that will strengthen marine security by requiring background checks for port workers through the Marine Transportation Security Clearance Program.

The proposed program would reduce the risk of security threats to the transportation system and help to prevent unlawful interference with the marine transportation system by requiring marine workers who perform certain duties or who have access to certain



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restricted areas to have a transportation security clearance. The requirements would also apply to marine pilots, wharfingers, security personnel and seafarers who have a Seafarers Identity Document.

## Ice Class Tugs Delivered by Irving Shipbuilding

Nordane Shipping of Svendborg, Denmark took delivery of the first of two Ice Class 1A FS tugs from Irving Shipbuilding Inc of Canada in late January 2006. To ensure the lowest possible noise levels and to comply with the stringent Danish Maritime Authority regulations, floating floors are fitted throughout together with double thickness joiner panels and extensive insulation in the engine room.



Two remote-controlled FiFi monitors supplied by FFS capable of a discharge rate of 1,200 m<sup>3</sup>/h each are fitted just aft and above the wheelhouse. The monitors are supplied by a dedicated pump of 2,700 m<sup>3</sup>/h capacity, driven off the front end of the port main engine. A water curtain of 300m<sup>3</sup>/hr is also supplied by the pump, or alternatively foam can also be supplied at 300 cu. m./hr.

Below the waterline, the tug is fitted with a large "escort" keel forward to provide effective indirect towing capability and enhance course keeping, especially when running astern. The forward end of the skeg has been fitted with an icestop, designed to prevent the hull riding-up onto the ice. The aft end is fitted with two iceknives to divert large pieces away from the propellers.

Stevens Iceflower is the third iceclass vessel delivered by Irving Shipbuilding Inc since September 2005. Measuring 30.8m x 11.14m, the LR-classed Stevens

Iceflower is powered by a pair of Caterpillar 3516BHD diesels, developing 2,500hp each at 1,600 rpm. Heavy duty 2.4m diameter controllable pitch US255 Z drives were supplied by Rolls-Royce Aquamaster.

Trials results were even better than the builder had anticipated. A speed of 14 knots was achieved, together with a maximum bollard pull of 60.4 tons ahead, 56.9 astern.



To provide extra flexibility to help secure niche charters, a Kamewa 45TV bow thruster of 150kW is also fitted. Auxiliary power is provided by two Caterpillar C9 gensets developing 165kW each. For towing and anchor-handling operations, a set of 200mm towpins is installed in conjunction with a 150 tonne Ridderinkhof aft towing winch, Ridderinkhof tugger winch/capstan, a 75 tonne Washington Chain tow-hook and a stern roller. The frequency-controlled aft winch is a single drum type (complete with spooling gear) capable of storing 762m of 51mm wire.

The 150 ton Ridderinkhof electric line handling winch on the raised foredeck is capable of storing 400 ft. of 3.25-in. Spectra line. This winch is also fitted with heavy duty spooling gear. Comfortable accommodation for six is provided (all in single cabins). The Captain and Chief Engineer's cabins are located on the main deck, the remainder on the lower deck.

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Circle 251 on Reader Service Card

# MAN B&W Raises the Mark

While MAN B&W is riding a record orderbook, the company is far from resting on its laurels, instead investing - as has been its penchant - in Research & Development to ensure its engines maintain a dominant position powering ships at sea. — by Greg Trauthwein

In May 2006 MAN B&W welcomed executives from its licensees around the globe to Copenhagen, Denmark — an event repeated every four or five years — to update them on recent technological innovations as well as to strategize on the market for the coming half decade. It was at this meeting that the company released details on several new engines currently under development, as well as turbocharger developments.

## The Market

MAN B&W, as many other suppliers and shipbuilders have, enjoyed unprecedented growth and record orderbooks over the past few years. When in 2001 the company announced "we have seen an unprecedented order intake for our MC brand engines," including a backlog at licensees that registered an all-time high, it was commonly thought that the ensuing four or five years would be marked by modest growth.

In reality, 2001 was simply a harbinger of better times to come, as more MC engine power has been sold than in any



MAN B&W's Danish headquarters.

previous time, and the order backlog has doubled since the 2001. Counting deliveries and backlog, the reference list of MC engines is approaching 200 million horsepower, and the come company estimates its current market share to be 75 percent.

Driving the business, obviously, has been record levels of shipbuilding activity, peaking in 2004 when more than 2,200 ships larger than 2,000 dwt were ordered.

Traditional ship types — bulk carriers, tankers and containerships — are

responsible for the bulk of new construction activity, and delivers for all three groups will remain at elevated levels, approaching 1,600 ships per year, through 2009.

But as the shipbuilding market traditionally rides a boom and bust wave, MAN B&W as well as much of the industry are approaching the coming five years with caution, as economic and transportation forecasts suggest that many maritime niches will soon enter the excess tonnage territory, traditionally a trigger for falling freight rates and ship prices.

"Everybody in the industry is booked, everybody's busy, but it will slow down, as the market is now overheated," said Ole Grøne, Senior Vice President, Sales and Marketing.

Uncertainties such as war, political unrest and the continued elevated prices

for all energy will surely make the market even more unpredictable, but following basic supply and demand projections, supply of new tonnage in many sectors should surpass demand in a few years.

While continuing to serve its traditional markets, MAN B&W has investigated a number of new market niches for its propulsion equipment, including LNG carriers, ice class tankers and RoRo ships.

Market watchers have been bullish on the prospects for the LNG niche for a number of years, a prediction supported by a record level of newbuild order for LNG tankers. As oil prices rise and remain high, the demand for LNG will grow proportionately. Traditionally, LNG carriers have been driven by steam propulsion, however diesel engine manufacturers have made significant progress in recent years.

MAN B&W currently has orders for more than 70 engines to power new LNG carriers.

One of the biggest challenges for the engine maker and its licensees during this period has simply been keeping up with demand. While Grøne said that the company's Chinese shipyard licensees are all currently expanding capacity to increase capacity and reduce delivery time, there has been a shortage from sub-suppliers in recent years, particularly crankshafts. And while there is a push for engine building expansion, much of it is for the larger two-stroke engines, resulting in a shortage of capacity on the medium and small engine niches.

## Development of the Mk9

For a number of years the large engine types of MAN B&W have been stable in



MAN B&W Diesel 7S65ME-C on testbed at Hitachi-Zosan after type test.

After an intensive R&D effort, the modernized K80/90 and S80 engines are significantly lighter yet more powerful.

	S80ME-C	K80ME-C	K90ME	K90ME-C
Power, kW per cyl	.4510	.4530	.5720	.5730
Speed (rpm)	.78	.104	.94	.104
Bore (mm)	.800	.800	.900	.900
Stroke (mm)	.3450	.2600	.2870	.2600
Mep (bar)	.20	.20	.20	.20
Pmax (bar)	.160	.160	.160	.160
Mps (m/s)	.9	.9	.9	.9
Length (7 cyl.) (mm)	.12034	.12034	.13395	.13395

their design, in that the manufacturer has been busy keeping up with orders, and in its view, the engines were more than competitive in their ranges. However, as the company projects a slowing few years, it embarked upon a plan to modify and improve its S/K80ME-C and K90ME/ME-C engines — the new "Mark 9" engines — with an eye toward boosting power while adopting a number of the latest design features, features geared toward saving significant amounts of weight and, in the end, user costs. Based on results announced by MAN B&W, it seems this end has been met.

The redesigned engines are a complete

## DieselHouse Opens



**His Royal Highness Crown Prince Frederik of Denmark (left) after the official opening of MAN B&W Diesel's new five-star attraction, DieselHouse. DieselHouse is a technical and cultural experience center dedicated to the diesel engine technology.**

In mid May His Royal Highness Crown Prince Frederik of Denmark officially opened MAN B&W Diesel's new five-star attraction, DieselHouse, a technical and cultural experience center dedicated to the diesel engine technology. DieselHouse is on the site of the H.C. Ørsted power station, in the building housing the B&W diesel engine from 1932, which was used as late as 2003 to start up the East Danish power grid after a major collapse.

The heart of the exhibition is the huge engine, which was the world's largest diesel engine for 30 years. In addition to the engine DieselHouse has on display everything from the most modern interactive exhibitions to an extensive collection of ship and engine models from the production at the B&W shipyard and engineering works. The engine will be started up once a month during DieselHouse's opening hours, so visitors can experience the sound and smell of a diesel engine.

workover, from the bedplate, framebox, cylinder frame, combustion chamber to the exhaust valve. While the new engines are touted for saving the shipowner weight and subsequent cost, as well as the manufacturer time and money in producing the power units, eyes were always kept on ensuring the robust nature of the engines. Thomas

Knudsen, Senior Vice President of Research & Development, explained that shipowners are pressing manufacturers, particularly diesel engine makers, to raise the figures which indicate the wear life of components, as they seek to go longer between major overhauls. There is even one shipowner who reportedly is trying to extend drydock-

ing to every seven years (vs. the traditional five), due to superior coatings.

The modernized K80/90 and S80 engines have new performance data that the company believes positions them as extremely competitive. The mean effective pressure (mep) of 20 bar and the maximum firing pressure of 160 bar was chosen to offer good specific fuel oil



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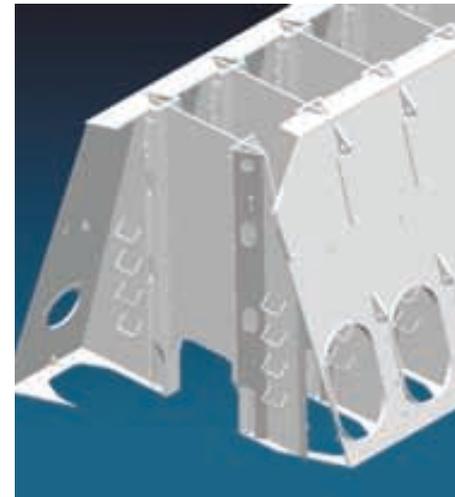
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consumption. This is particularly impressive in light of the fact that the output of the three modified engines is increased by up to 25 percent. The uprated engines will be launched only in "relevant cylinder numbers," meaning that the K80/K90 engines are available

with 6 to 12 cylinders, and the S80ME-C are available with 6 to 9 cylinders.

The engines increased power is particularly significant as the higher specific output means that engines with fewer cylinders can be applied, helping to reduce cost and weight. One major

design change that significantly cuts cost and weight is the introduction of differentiated cylinder distances. It is possible to use shorter cylinder distances in the fore cylinder units, as the torque to be transferred through the crank throws is smaller compared to the



**The improved framebox design incorporates many features which are designed to reduce production costs and allow easier access for operators.**

aft of the engine. For example, for a 12K90ME/ME-C Mark 9 engine, the six foremost cylinder units can have a cylinder distance of 1492 mm compared to 1602 mm for the six aft cylinder units. The weight savings is 25 tons, and the total engine length is shortened by more than .5 m. On the 8K90ME/ME-C the numbers are even better, as the shorter cylinder distance can be applied on all cylinders, offering a weight savings of 34 tons and an engine length reduction of nearly one meter.

The updated engines, like the new engines among the ME/ME-C/MC-C types, have a triangular plate frame-box with twin stay bolts. When setting out to develop the concept, the company laid out several criteria to meet, including: the design should match or be superior to existing MAN B&W design in terms of functionality; it should help to reduce production costs; there should be an uprating potential without losing production benefits; and it should be possible to introduce a design prepared for omission of Post Weld - Heat Treatment (PW-HT).

### MAN B&W Logs Orders for New Engine Types

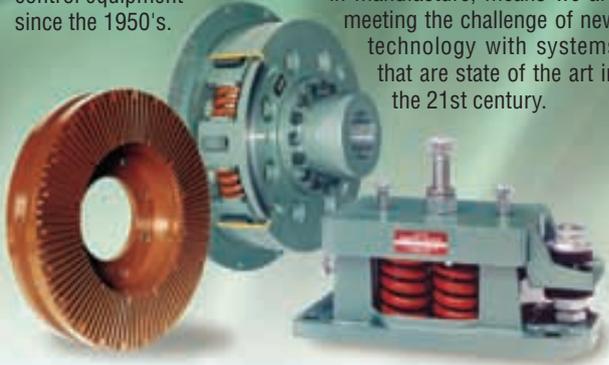
MAN B&W Diesel introduced two new engines - S35ME-B and S40ME-B - an upgrade to the 35MC and 42MC engines to electronically controlled engines designed to provide better economy, management and maneuverability.

Before upgrading the engines, the engine maker studied the market and concluded that the power against propeller speed for tankers, containers and bulkers in the size bracket showed that a 35 cm bore engine with slightly reduced speed, at 167 rpm, and a higher engine power would suit the market well. In the segment for the S42MC type, the company concluded that a 40 cm bore

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engine with 146 rpm, together with the updated 35 cm bore engine, will cover the required output area between the S26MC and the S50MC-C/ME-C types. Thus, to fulfill these requirements, electronically controlled fuel injection was introduced on the new engines.

In a development the company views as a vindication of its conclusion, it has received orders for the engines from owners in Turkey and Cyprus.

İçdas Çelik Enerji Terasne ve Ulasim Sanayi A.S. in Turkey has signed a contract for delivery of 2 x 8S35ME-B for delivery in 2008. The engines will be built by MAN B&W Diesel in Frederikshavn.

The contract also covers MAN B&W Diesel CP-propellers of type VBS1280-



ODS. InterShip Navigation of Cyprus has ordered 6S40ME-B engines for 2 x 6 multipurpose vessels of 25,000 dwt, the first lot to be built in China. Six of the engines will be built by STX in Korea.

With the ME-B series, MAN B&W Diesel introduces the ME concept also for its small bore two-stroke engines,

using the electronic concept for fuel injection control introduced on the large bore engines.

Electronic control of the fuel injection is designed to be user friendly and to provide owners with an efficient means to manage emissions.

**Circle 1 on Reader Service Card**

#### S35ME-B Engine Specifications

Bore	.....350 mm
Stroke	.....1550 mm
MEP	......21 bar
Speed	......167 rpm
Mean Piston Speed	......8.6 m/s
Power	......870 kW/cyl.
SFOC	......171-176 g/kWh

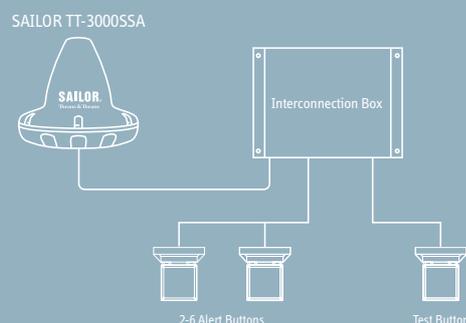
#### S40ME-B Engine Specifications

Bore	......400 mm
Stroke	......1770 mm
MEP	......21 bar
Speed	......146 rpm
Mean piston speed	......8.6 m/s
Power	......1135 kW/cyl
SFOC	......170-175 g/kWh



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## Deutz Bridges Gap in Engine Program

With the addition of the compact engines of the 1013 series to its marine engine range, Deutz bridged the gap between the lower power class, covered by small water and air-cooled engines,

and the upper power class. The four and six-cylinder 1013 series engines span the power range between 70 and 195 kW with speeds between 1,500 and 2,300 rpm. They are suited both as marine propulsion units for work boats, fishing craft and pleasure boats as well as onboard gensets. The engines have a

bore of 108 mm and a stroke of 130 mm, corresponding to a displacement of 4.76 respectively 7.15 liters. All engines are equipped with an exhaust turbocharger and supplied with charge air cooling, depending on the individual power requirement. Exhaust manifold, turbocharger and charge air cooler are



water-cooled. Efficient fuel consumption is ensured by a high-pressure injection system with unit injection pumps (PLD). On request, the engines can be equipped with double-walled injection lines. For cooling purposes there are available the following alternatives: either dual-circuit cooling with mounted plate-type heat exchanger, cooling water pump, raw water pump, expansion tank and the required thermostats or keel cooling with cooling water pump and integrated thermostats. Wet cylinder liners ensure a long engine life. All service points are easily accessible on one engine side.

Circle 2 on Reader Service Card

## Broström Tanker Propelled by Rolls-Royce

Bro Deliverer from Jinling shipyard in China is the first of a series of four innovative combined product/chemical tankers which will be propelled, maneuvered and moored using Rolls-Royce equipment. The D-class Broström vessels are designed to meet the present and future requirements of the oil and chemical industry, both in terms of the volumes and types of cargo to be carried, and in providing safe, low environmental impact and economical transport.

Rolls-Royce will supply each vessel with two Ulstein Aquamaster Azipull thrusters rated at 2,380 kW each for main propulsion. The AZP120 units with pulling propellers are the first Azipull thrusters to go into service in tanker propulsion. They provide propulsion and steering, and are supplemented by a Kamewa Ulstein TT1850 tunnel bow thruster of 1,000kW. Loaded service speed is about 13 knots. By using two azimuth thrusters for propulsion, each with its own medium speed main engine, independent steering and separate fuel systems for each engine, a high level of propulsion redundancy has been achieved, and Bro Deliverer has RP class notation from DNV and Clean Design class. Broström's D-class tankers have a deadweight of about 14,500 dwt on a draft of 26.2 ft. (8 m), an overall length of 481.6 ft. (146.8 m), a beam of 72.2 ft. (22 m) and 14 tanks with a capacity of 18,556 cu. m.

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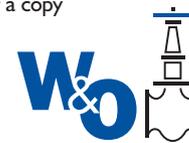
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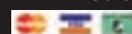
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## Wärtsilä Records High Demand

Demand for Wärtsilä's ship power solutions for LNG carriers and offshore applications continued to be high during May and June. In the offshore market, received orders from an undisclosed Korean shipyard to supply 24 Wärtsilä 32 diesel generating sets to power four drill ships. The deliveries will take place from 2008 onwards. During May and June, Wärtsilä received orders for 26 LNG carriers installations from three Korean shipyards, predominantly featuring Wärtsilä 50DF dual-fuel engines. These deliveries will take place during 2008-2010. The value of these new orders amounts to approx. \$377.7m, of which approximately \$163.6m has been recorded in May order book and \$214m will be recorded in June order book.

## Voith Turbo Strengthens Coupling Service

Under the name Voith Coupling Service, the specialist for drive technology is offering a new service concept for turbo couplings. The proper maintenance overhauling and repair of drive components are the focus of this concept. Voith Turbo has introduced this program in reaction to the general trend of reducing jobsite service personnel and increasing the responsibility of the original equipment manufacturer. Full customer care, competent consultation, and quick assistance if there are malfunctions are first priority for Voith Coupling Service.

## Anti-heeling Pump

Allweiler AG manufacturers its ALLTRIMM anti-heeling propeller pump in seawater-resistant aluminum bronze (CC333G). This inline propeller pump has reversible hydraulics and a uniform pumping capacity. Three radial-shaft sealing rings contain an integrated leak sensor. The electric motor is constructed with standard parts from a German manufacturer and conveniently integrated into the pump lobe. As a result, the pump forgoes components required in conventional designs such as a valve controller, coupling, and gearbox. The pump is available in one and two-stage versions that deliver a flow rate up to 1300 cu. m./hour and delivery heads up to 10 m (single-stage) or 20 m (two-stage).

Circle 33 on Reader Service Card

## World's Largest Radial Turbocharger Debuts

MAN B&W recently introduced what it calls the world's largest radial turbocharger for two stroke engines and

thermo efficiency systems. The TCR series is designed to set new standards for radial-flow turbochargers: high power density, low weight and a compact design.

A total of six frame sizes cover four and two-stroke engines from 390 to 5,800 kW engine output per turbocharger. TCR22 is the largest frame size of the

series.

Test runs on a 6S35MC engine rated 4,440 kW/173 rpm showed efficiency over the entire load range, helping to lower fuel consumption as well as the exhaust gas temperature, which in turn relieves thermal stress on other engine components.

Circle 32 on Reader Service Card

## ZF Marine Relocates RI Service Center

ZF Marine LLC have relocated its Warwick, Rhode Island Service Center. The address for the new location: ZF Marine LLC, 225 Metro Center Boulevard - Unit 1, Warwick RI 02886, tel: (401) 463-3005; fax: (401) 463-3008.

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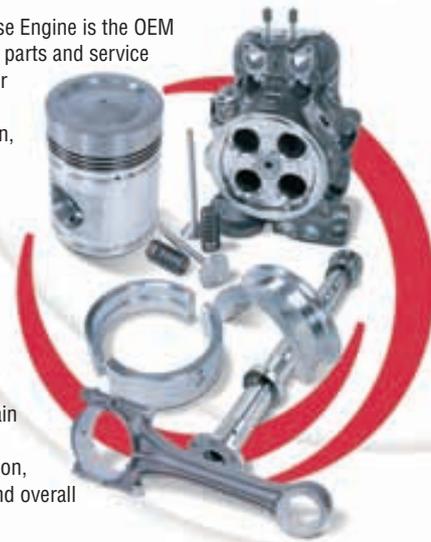
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## 2006 Diesel Engine Technical Guide

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The corresponding technical guide — starting on page 39 — delivers up-to-date information on each of the company's diesel engine technical specifications.

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### Akasaka

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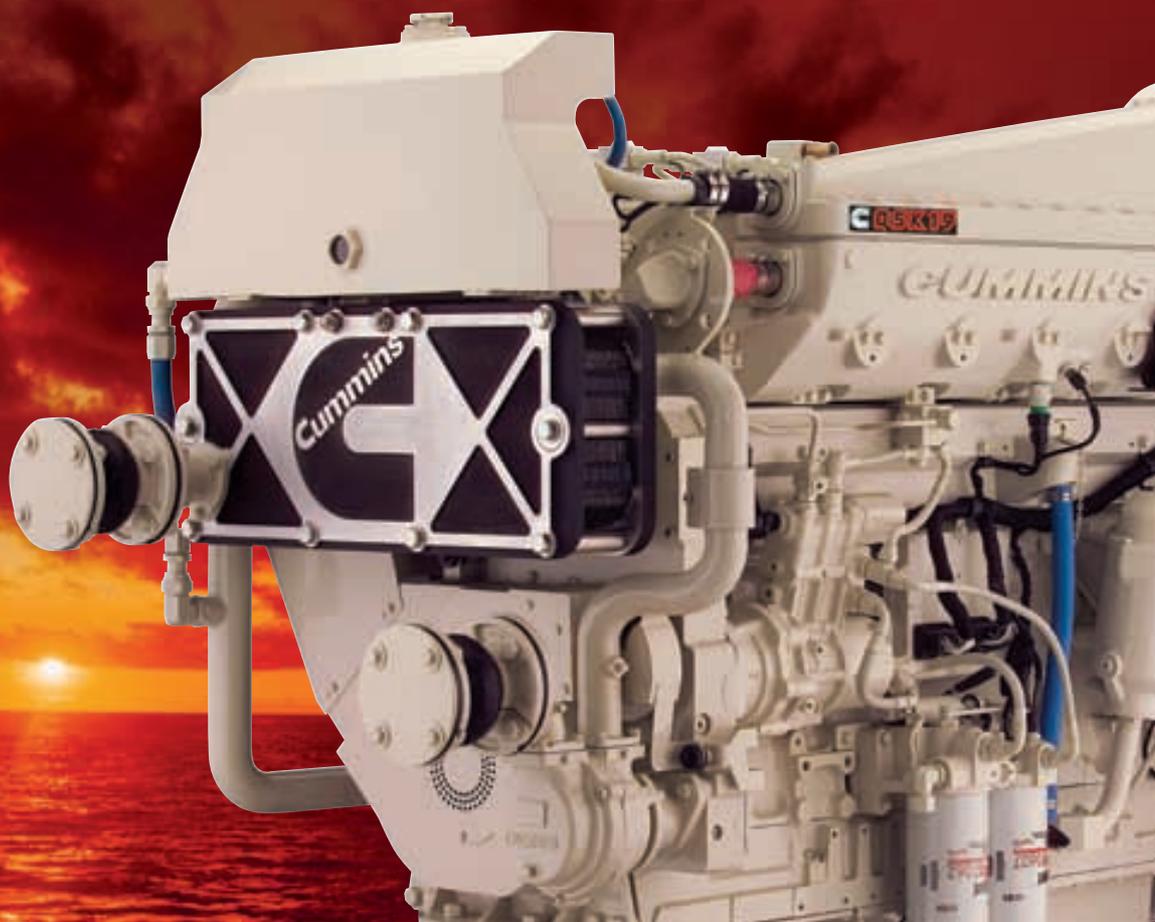
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	T26	.260	.440	.6	.104.2	.350 - 400	.13.4 - 15.3
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	A28/A28S	.280	.550	.6	.183.8 - 196	.320 - 340	.20.3 - 20.4
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	A31	.310	.600	.6	.220.8	.290	.20.2
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	S35	.350	.640	.6	.318.7	.280	.22.2
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	A38/S	.380	.740	.6	.343.3 - 367.7	.240 - 250	.20.4 - 21.0
	DM41AK	.410	.640	.6	.441.2	.350	.17.9
	AH41AK	.410	.640	.6	.490.3	.350	.19.9
	A41/S	.410	.800	.6	.404.2 - 441.2	.230 - 240	.20.0 - 20.9
	A45/S	.450	.880	.6	.490 - 551.5	.210 - 220	.20.0 - 21.5
<b>Alaska Diesel Electric - Lugger / Northern Lights</b>							
	L6140AL2	.140	.165	.6	.62.2 - 87	.1800 - 2100	.16.3 - 19.6
	L6170	.170	.170	.6	.87 - 112	.1800 - 2100	.15.0 - 16.6
<b>Baudouin</b>							
	M26	.150	.150	.6 - 12	.55.2 - 79.7	.1800 - 2000	.13.9 - 18.0
	6B2650	.150	.150	.6	.79.7 - 85.8	.2100 - 2200	.17.2 - 17.7
<b>Bergen</b>							
	B32:40	.320	.400	.6 - 16	.500	.750	.24.9
	C25:33LP	.250	.330	.6 - 9	.240.0	.1000	.17.8
	K/KB	.250	.300	.6 - 9	.202 - 222.9	.750 - 900	.20.1 - 22.0
<b>Bez Motory</b>							
	C28	.275	.330	.6	.234.2	.750	.19.1
<b>Callesen</b>							
	425	.250	.300	.3 - 4	.44 - 59	.500	.7.3
	427	.270	.400	.3 - 8	.58.8 - 124.1	.395 - 500	.10.5
<b>Caterpillar</b>							
	C9	.112	.149	.6	.42.8 - 62.5	.2100 - 2500	.16.7 - 20.4
	C12	.130	.150	.6	.42.2 - 87.7	.1800 - 2300	.14.1 - 23.0
	3400C	.137152	.165	.6 - 12	.31.2 - 72.2	.1800 - 2100	.8.5 - 16.9
	3400E	.137152	.165	.6 - 12	.26.4 - 99.5	.1200 - 2300	.11.8 - 21.3
	C15	.137	.165	.6	.99.5 - 106	.2300	.21.3 - 22.7
	3412D	.145	.162	.12	.33.7 - 54.3	.1800 - 2100	.8.4 - 13.1
	C18	.145	.183	.6	.56.5 - 124.3	.1800 - 2300	.12.5 - 21.5
	C30	.145	.152	.12	.93.3 - 96.3	.2300	.19.3 - 20.0
	C32	.145	.162	.12	.68.3 - 111.9	.2100 - 2300	.14.6 - 21.8
	3500	.170	.190	.8 - 16	.65.8 - 108.8	.1200 - 1800	.13.8 - 17.4
	3500B	.170	.190	.8 - 16	.68.3 - 139.9	.1200 - 1925	.15.8 - 20.2
	3500B HD	.170	.215	.12 - 16	.87.4 - 125	.1200 - 1600	.16.7 - 19.2
	3500C	.170	.190	.8 - 16	.72.3 - 102.5	.1200 - 1800	.15.1 - 21.6
	3500C HD	.170	.215	.12 - 16	.72.3 - 157.8	.1200 - 1800	.16.2 - 21.6
	C280	.280	.300	.6 - 16	.288.3 - 338.8	.900 - 1000	.20.7 - 22.8
	3600	.280	.300	.6 - 18	.287 - 400	.900 - 1050	.20.0 - 24.7
<b>CRM</b>							
	12 D/SS	.150	.180	.12	.76.5 - 84.2	.2020 - 2075	.14.3 - 15.3
	12 D/22-1500	.150	.180	.12	.83.6 - 91.9	.2050 - 2120	.15.4 - 16.3
	18 D/SS	.150	.180	.18	.61.3 - 67.4	.2020 - 2075	.11.4 - 12.3
	BR-1	.150	.180	.18	.67.4 - 74.2	.2050 - 2120	.12.4 - 13.2
	BR-2	.150	.180	.18	.77.9 - 85.8	.2050 - 2120	.14.3 - 15.3
<b>Cummins Marine</b>							
	KTA19-M3	.159	.159	.6	.62.2 - 79.5	.1800	.13.2 - 16.9

BRAND NAME	Model Series	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
	KTA19-M4	.159	.159	.6	.87	.2100	.15.9
	QSK19-M	.159	.159	.6	.82 - 99.5	.1800 - 2100	.17.4 - 18.1
	QSK19-M Tier 2	.159	.159	.6	.62.2 - 93.2	.1800 - 2100	.N/A
	KTA38-M0	.159	.159	.12	.46.6 - 52.8	.1600 - 1800	.11.1 - 11.2
	KTA38-M1	.159	.159	.12	.55.9 - 68.4	.1600 - 1800	.13.4 - 14.5
	KTA38-M2	.159	.159	.12	.65.3 - 93.3	.1600 - 2050	.15.6 - 17.4
	QSK38-M Tier 2	.159	.159	.12	.80.8 - 87	.1800 - 1900	.N/A
	KTA50-M2	.159	.159	.16	.65.3 - 87.4	.1600 - 1950	.15.6 - 17.1
	QSK50-M Tier 2	.159	.159	.16	.79.3 - 88.6	.1800 - 1900	.N/A
	QSK60-M	.159	.190	.16	.93.3 - 116.5	.1600 - 1900	.18.5 - 19.5
	4B3.9-D(M)	.102	.120	.4	.9.3 - 11.3	.1500 - 1800	.7.6
	4BT3.9-D(M)	.102	.120	.4	.11.5 - 17.3	.1500 - 1800	.10.2 - 11.7
	6BT5.9-D(M)	.102	.120	.6	.13 - 18.7	.1500 - 1800	.10.6 - 12.7
	6BTA5.9-D(M)	.102	.120	.6	.12.5 - 15.5	.1800	.8.5 - 10.6
	6CTA8.3-D(M)	.114	.135	.6	.20.3 - 23.3	.1500 - 1800	.11.9 - 11.3
	6CTA8.3-D(M)/6CTA8.3-DM114	.135	.135	.6	.27.2 - 33.5	.1500 - 1800	.15.8 - 16.3
	QSM11-DM	.125	.147	.6	.44.2 - 52.8	.1500 - 1800	.19.6 - 19.5
	NT855-D(M)	.140	.152	.6	.34.8 - 49.2	.1500 - 1800	.N/A
	NTA855-D(M)	.140	.152	.6	.46.7 - 59.7	.1500 - 1800	.N/A - 17
	KTA19-D(M)	.159	.159	.6	.56 - 84.5	.1500 - 1800	.14.3 - N/A
	KTA19-D(M1)	.159	.159	.6	.59.7 - 80.8	.1500 - 1800	.15.2 - 17.2
	QSK19-DM Tier 2	.159	.159	.6	.82 - 93.3	.1500 - 1800	.N/A
	VTA28-D(M)	.140	.152	.12	.42.9 - 50.7	.1500 - 1800	.N/A - 14.5
	KTA38-D(M)	.159	.159	.12	.52.8 - 83.9	.1500 - 1800	.N/A
	KTA38-D(M1)	.159	.159	.12	.62.2 - 80.8	.1500 - 1800	.15.8 - 17.2
	QSK38-DM Tier 2	.159	.159	.12	.87	.1800	.N/A
	KTA50-D(M)	.159	.159	.16	.55 - 76.3	.1500 - 1800	.N/A
	KTA50-D(M1)	.159	.159	.16	.62.9 - 80.7	.1500 - 1800	.16 - 17.1
	QSK50-DM Tier 2	.159	.159	.16	.83.9	.1800	.N/A
	QSK60-D(M)	.159	.190	.16	.97.7 - 118.8	.1500 - 1800	.20.8 - 21
	6B-CP	.102	.120	.6	.13.3 - 16.5	.1500 - 1800	.14.6 - 12.7
	6B-CS	.102	.120	.6	.12.3 - 15.3	.1500 - 1800	.12.4 - 12.7
	6C-CP	.114	.135	.6	.22.7 - 28.3	.1500 - 1800	.14.6
	6C-CS	.114	.135	.6	.22.7 - 25.3	.1500 - 1800	.14.6
	K19-CP	.159	.159	.6	.55.8 - 76.7	.1500 - 1800	.15.2 - 17.2
	K38-CP	.159	.159	.12	.63.7 - 76.7	.1500 - 1800	.N/A - 17.2
<b>Cummins MerCruiser</b>							
	QSC8.3-540	.114	.135	.6	.32.7 - 66.2	.2000 - 2600	.14.2 - 22.2
	QSM11	.125	.147	.6	.66.5 - 87.7	.2100 - 2500	.19.2 - 23.3
<b>Daewoo Doosan</b>							
	V 158TI	.128	.142	.8	.44.1 - 62.5	.1800 - 2300	.15.8 - 18.2
	V 180TI	.128	.142	.10	.44.1 - 60.3	.1800 - 2300	.15.3 - 18.6
	MD182TI	.128	.142	.12	.34.3 - 46.6	.1800 - 2300	.12.5 - 13.3
	V 222TI	.128	.142	.12	.44.2 - 61.3	.1800 - 2300	.15.6 - 17.9
<b>Daihatsu Diesel</b>							
	DKM-20	.200	.300	.6 - 8	.156 - 159	.900	.22.1 - 22.5
	6DKMS-25	.250	.360	.6	.245	.750	.22.2
	DKM-26	.260	.380	.6	.269.7	.750	.21.4
	6DKMS-28	.280	.385	.6	.306.4	.750	.20.7
	DKM-28	.280	.390	.6 - 8	.313 - 319	.720 - 750	.20.8 - 22.1
	DKM-36	.360	.480	.6 - 8	.551.5	.600	.22.6
<b>DEUTZ</b>							
	FM 1015	.132	.145	.6 - 8	.43.5 - 70.8	.2100 - 2300	.12.5 - 18.6
<b>Electro-Motive Division of General Motors Corp.</b>							
	645E6	.230	.254	.8 - 16	.93.3 - 98.1	.900	.5.9 - 6.2
	645F7B	.230	.254	.8 - 20	.149.3 - 163.1	.900	.9.4 - 10.3
	710	.230	.280	.8 - 20	.186.5	.900	.10.7
	H	.263	.300	.16	.260.9 - 279.7	.900 - 1000	.20.3 - 21.0
<b>Fairbanks Morse</b>							
	ALCO 251	.228.00	.267.00	.6 - 18	.127.3 - 191.4	.900 - 1200	.17.5 - 18.9
	38TD8-1/8	.206.4	.254	.6 - 12	.261.1 - 217.6	.750 - 900	.20.5
<b>GE Diesel</b>							
	7FDM	.229	.267	.8 - 16	.149.1 - 210	.900 - 1050	.18.2 - 21.9
	7FDM-EFI	.229	.267	.8 - 16	.149.1 - 210	.900 - 1050	.18.2 - 21.9
<b>Grenaa</b>							
	FR24	.240	.300	.6	.51.7 - 123	.750	.6.1 - 14.5

## 2006 Diesel Engine Technical Guide

BRAND NAME	Model Series	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
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### Guangzhou

230Z	230	300	6-8	135-176	750-900	17.1-22.6
320Z	320	440	8-12	202-283	450-525	15.2-18.3
G32	320	480	6-8	444	600	23.0

### Guascor

F180	152	165	6	30.7-79.4	1800-2000	6.8-17.2
F240	152	165	8	55.2-79.5	1800	12.3-17.7
F360	152	165	12	55.2-79.5	1800-2000	12.3-17.7
F480	152	165	16	58.4-79.5	1800	13-17.7

### Hanshin

6L24GSH	240	400	6	79.7	400	13.2
LH26	260	440	6	147.0	420	18.0
LH26/A	260	440	6	171.5	450	19.6
LC26	260	440	6	104.2	400	13.4
LH28	280	460	6	171.5	395	18.4
LH30L	300	600	6	220.5	300	20.8
LH31	310	530	6	220.5	370	17.9
LH32L	320	640	6	245.2	280	20.4
LH34LA	340	640	6	269.7	280	19.9
LA34	340	720	6	294.2-306.5	260-265	21.2-21.7
LH36L/LA	360	670	6	294.2-367.8	240-270	20.7-21.3
LH41L/LA	410	800	6	404.5-441.3	225-240	20.4-20.9
LH46L/LA	460	880	6	490.3-551.5	200-220	20.1-20.6

### Hedemora Diesel

VA	185	210	12-18	91.7	1350	14.4
VB	210	210	12-18	116.7	1350	14.3

### Himsen

H21/32	210	320	6-9	160-200	720-1000	21.7-24.1
H25/33	250	330	6-9	290.0	900	23.9

### Isotta Fraschini

1300	130126 / 142	6-12	36.7-73.3	1800-2700	13-19.4	
1700	170	170	8-16	87.5-146.9	1800-2000	15.1-21.8
VL 1716 T2	170	185	16	122.5-168.8	1800-2000	19.4-24.1

### Iveco

8281/8291	155	130	8-12	25.8-64.6	1800-2200	7.0-19.6
CURSOR 550	115.00	125.00	6	49-67.5	2600	17.4-24.0
CURSOR 600	135.00	150.00	6	61.3-73.5	2000	17.1-20.5
CURSOR 770	135.00	150.00	6	66.2-94.5	2300	16.1-23.0
VECTOR	145.00	152.00	8	62.5-110.4	1800-2300	16.6-22.9

### John Deere

6125AFM	127	165	6	42.3-65.3	1800-2100	13.5-17.9
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### Kelvin

KEL140-6M	140	165	6	59.0	1800	15.1
TBSC8	165	184	8	49.9	1350	11.5
KEL170-6M	170	170	6	93.3	1800	15.2

### Kolomna

N14/14	140	140	8-12	38.0-45.8	2100-2350	10.1-10.6
D49	260	260	4-20	182.5-267.5	1000	15.9-23.2
D42-30/38	300	380	4-8	275-491.7	750	16.4-29.3

### Komatsu

117	117.9	150	6	58.2-64.4	2200-2300	19.4-20.5
122	121.9	150	6	67.4-74.6	2200-2300	21-23.0
125	125	150	6	61.3-68.4	2200-2300	18.2-19.4
132	132.9	165	6	70.5-85.8	2100-2200	17.6-20.4
137	137.9	165	6	83.4-94.4	2100-2200	19.3-20.9
140	140	165	6-12	55.2-94.3	1900-2100	11.1-16.8
170	170	170	6	111.6-122.6	2000	17.3-19.1

### MaK

M20	200	300	6-9	170-190	900-1000	24.1-24.2
M25	255	400	6-9	290-330	720-750	23.7-25.8
M32C L	320	480	6-9	480-500	600	24.9-25.9
M32C V	320	420	12-16	480-500	720-750	23.7
M43C	430	610	6-16	900-1000	500-514	24.4-27.1

BRAND NAME	Model Series	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
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### Makita

M30M	300	480	6	183.9	375	17.4
L30M	300	600	6	223.8-248.7	300-330	21.1-21.0
M31M	310	550	6	223.8-248.7	320-355	20.2-20.0
L31M	310	600	6	223.8-248.7	290-320	20.4-20.3
M32M	320	550	6	223.8-248.7	315-350	19.3-20.2
M33M	330	600	6	248.7-286	290-330	20.0-20.0
LS33L	330	640	6	186.5-245.2	250-290	16.3-18.5
LS35L	350	680	6	211.4-282	245-275	15.8-18.8
LS38L	380	740	6	261.1-343.2	230-255	16.2-19.2
LS42L	420	840	6	317.1-416.8	205-227	15.9-18.9

### MAN Nutzfahrzeuge AG

D28	128	142	6-12	36.8-79.7	1800-2300	12.9-22.7
D28 CR	128	142	6-12	75-98	2300	21.4-28.0
2866	128	155	6	748	2200	20.5
2876	128	166	6	77.2-89.5	2100-2200	17.1-22.8

### MAN B&W AG

S26MC	260	980	4-12	275-400	212-250	14.8-18.5
L35MC	350	1050	4-12	440-650	178-210	14.7-18.4
S35MC	350	1400	4-12	505-740	147-173	15.3-19.1
L42MC	420	1360	4-12	640-995	141-176	14.4-18.0
S42MC	420	1764	4-12	730-1080	115-136	15.6-19.5
S46MC-C	460	1932	4-8	880-1380	108-129	15.2-20.0
L50MC	500	1620	4-8	640-1330	111-148	10.9-17.0
S50MC	500	1910	4-8	690-1430	95-127	11.5-18.0
S50MC/ME-C	500	2000	4-9	760-1660	95-127	12.2-20.0
L60MC	600	1944	4-8	920-1920	92-123	10.9-17.0
L60MC/ME-C	600	2022	4-9	1520-2340	105-123	15.2-20.0
S60MC/ME	600	2292	4-8	980-2040	79-105	11.5-18.0
S60MC/ME-C	600	2400	4-8	1090-2380	79-105	12.2-20.0
S65ME-C	650	2730	5-8	1960-2870	81-95	16.0-20.0
L70MC	700	2268	4-8	1355-2830	81-108	11.5-18.0
L70MC/ME-C	700	2360	4-8	2090-3270	91-108	15.2-20.0
S70MC	700	2674	4-8	1350-2810	68-91	11.5-18.0
S70MC/ME-C	700	2800	4-8	1490-3270	68-91	12.2-20.0
K80MC/ME-C	800	2300	6-12	2470-3610	89-104	14.4-18.0
S80MC	800	3056	4-9	1740-3640	59-79	11.5-18.0
S80MC/ME-C	800	3200	6-8	1860-4180	57-78	12.2-20.0
K90MC/ME-C	900	2300	6-12	3130-4570	89-104	14.4-18.0
K90MC/ME	900	2550	4-12	2210-4570	71-94	11.5-18.0
S90MC/ME-C	900	3188	6-9	3188-5270	61-78	15.2-20.0
K98MC/ME-C	980	2400	6-14	4140-6020	94-104	14.6-19.2
K98MC/ME	980	2660	6-14	4100-6230	84-97	14.6-19.2
K108ME-C	1080	2660	6-14	5340-6950	90-94	14.6-18.2
21/31	210	310	6-9	215	1000	24.1
23/30A/AE	225	300	6-12	133.3-160	825-900	16.3-17.9
27/38	270	380	6-9	340	800	23.4
28/32A	280	320	6-16	245	775	19.2
32/40	320	400	6-18	500	720-750	24.9-25.9
40/50	400	500	12-20	750	600	23.9
40/54	400	540	6-9	700-720	500-550	23.2-24.8
48/60	480	600	6-18	1050	500-514	22.6-23.2
48/60B	480	600	6-18	1200	500-514	25.8-26.5
58/64	580	640	6-9	1390	428	23.0

### MAN B&W Diesel LTD

RK280	280	330	12-20	450	1000	26.6
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### Matsui Diesel

ML624G/A/H/S/C	240	400	6	42.9-110.3	420-420	6.9-17.7
ML626GSC	260	480	6	61.3-161.6	310-410	10.8-18.6
ML627GSC	270	480	6	73.6-186.4	300-410	10.7-19.9
MS28BGFC	280	500	6	184	390	18.4
MA28GSC	280	540	6	85.8-183.9	290-365	10.7-18.0
MA29GSC	290	540	6	85.8-208.4	290-375	10.0-19.0
MA31GSC	310	600	6	122.6-220.7	260-320	12.5-19.5
MA32GSC	320	600	6	122.6-245.2	270-320	11.3-19
MA33GSC	330	600	6	269.7-281.8	330-340	19.1-19.4

### Megatech

MB 447LA	128.00	155.00	6	46.6-73.6	1800-2300	15.6-19.2
MB 447PE	128.00	155.00	6	88.3	2400	22.1
MB 457PE	132.50	155.00	6	98.1	2400	22.9

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>Mitsubishi Heavy Industries Ltd.</b>						
UE33LSII	330	1050	4-8	306.7-567.5	162-215	12.5-17.3
UE37LA	370	880	4-8	280-520	158-210	11.4-15.7
UE37LSII	370	1290	5-8	420-772	158-210	12.5-17.3
UE43LSII	430	1500	4-8	570-1050	120-160	12.5-18.1
UE45LA	450	1350	4-8	477.5-889	119-158	11.5-15.7
UE50LSII	500	1950	4-8	144.5-1445.1	95-127	12.5-17.3
UE50LSE	500	2050	5-8	1160-1660	99-124	13.9-20.0
UE52LA	520	1600	4-8	640-1180	100-133	11.3-15.7
UE52LS	520	1850	4-8	720-1320	90-120	12.2-16.9
UE52LSE	520	2000	4-12	930-1700	95-127	13.8-19.4
UE60LA	600	1900	4-8	840-1550	83-110	11.3-15.7
UE60LS	600	2200	4-8	950-1770	75-100	12.2-17.1
UE60LSII	600	2300	4-8	1075-1986	79-105	12.5-17.3
UE60LSE	600	2400	5-8	1530-2255	90-105	15.0-19.0
UE68LSE	680	2690	5-8	2010-2940	81-95	15.2-19.0
UE75LSII	750	2800	4-9	1595-2940	63-84	12.5-17.0
UE85LSC	850	2360	5-12	2115-3900	76-102	12.5-17.1
UE85LSII	850	3150	4-9	1980-3860	54-76	12.6-17.0
SR	170	220	6-16	56.7-143.8	1350-2060	10.1-20.5
SU	240	260	6-16	165-202.3	1060-1200	15.9-17.2

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>MTU</b>						
2000	130	150	8-16	50-91.9	1900-2350	15.9-23.6
2000CR	135	156	8-16	90-112	2250-2450	21.5-24.6
SERIES 60	133	168	6	46.6-102.5	1800-2300	13.3-22.9
396	165	185	8-16	80-186.7	1600-2100	15.2-23.1
4000	165	190	8-16	87.5-170	1600-2100	16.1-23.9
595	190	210	12-16	190-270	1600-1800	23.9-30.2
1163	230	280	12-20	300-370	1200-1300	25.8-29.3
8000	265	315	20	410-450	1150-1200	24.6-27

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>Niigata Engineering Co.</b>						
NSAK	132.9	160	12-16	40.4-44.1	1950-2000	11.2-11.9
NSE	150	165	6	67.3-76	1950-2100	14.2-14.9
NSD	150	210	6	79.7-88.2	1450-1500	17.8-19
NSDL	160	235	6	91.8-101.7	1400-1450	16.7-17.8
MG17	165	215	6	92-101	1650-1700	34.3-36.6
16FX	165	185	8-16	125-139.2	1950-2000	19.4-21.1
MG19	190	260	6	122.5	1000	19.9
20FX	205	220	12-16	250-270.8	1650-1695	25-26.4
MG22	220	280	6-18	171.5-220.7	1000	19.3-24.4
MG25	250	350	6	220.5	750	20.5
26FX	260	275	12-18	312.6-378.8	1185-1290	21.7-24.1
MG26	260	275	6-18	230.1-245.2	750-1000	18.9-21.1
M26	260	460	6	104.2-171.5	400-440	12.8-19.1
MG28	280	370	8-18	294.1-367.8	750	20.6-24.4
M28	280	480	6	171.5-220.5	390-450	17.8-19.9
M30	300	530	6	196.0-290.0	290-360	17.4-19.1
M31	310	530	6	220.5	290-360	18.4-20.1
MG32	320	360	8-18	367.7	650-750	20.1-20.3
MG34	340	450	6-18	441.2-555	600	21.6-24.4
M34	340	620	6	269.7-306.3	240-310	18.5-21.3
M37	370	720	6	318.7	240	20.6
M38	380	700	6	343.2-367.8	240-300	18.5-21.6
40CX	400	520	6-8	405.0	450	16.5
MG40	400	520	6-8	441.3	450	18
MG41	410	560	6-18	661.8	500	21.5
M42	420	820	6	429.0	230	19.7

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>Scania</b>						
DI 12M	127	154	6	49-79.7	1800-2200	15.4-23.3
DI 16M	127	154	8	48.3-73.6	1800-2200	15.5-20.1

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>Seatek</b>						
10.3 ENDURANCE	127	135	6	116.3	3200	25.5
10.3 OFFSHORE	127	135	6	134.8	3350	28.2
6.4V.10D B1	127	135	6	95.5	3100	21.6
6.4V.10D B2	127	135	6	95.5	3100	21.6
6-4V-10.3 TWIN						
TURBO RACING	127	135	6	147.1	3250	31.7
800+	127	135	6	100.5	3100	22.7
800+ ELETTRONICO	127	135	6	104.2	3100	23.6
NAVY A1	127	135	6	80.8	3100	18.3
NAVY A2	127	135	6	80.8	3100	18.3
950+ BiTurbo	127	135	6	93.3-116.3	2800-3200	23.4-25.5

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>S.E.M.T. Pielstick</b>						
PA4-185	185	210	6-18	123.3	1500	17.5
PA4-200	200	210	8-16	165.6	1500	20.1
PA5-255	255	270	4-18	220.0	1000	19.1
PA6	280	290	6-20	295-325	1000-1032	19.8-21.2
PA6STC	280	290	12-16	323.3	1050	20.7
PA6B	280	330	12-20	405	1050	22.8
PA6BSTC	280	330	12-20	405	1050	22.8
PA6CL	280	350	6-18	294.0	750	21.8
PC2.5	400	460	16	478.1	520	19.1
PC2.6	400	460	12-18	550.0	520	21.9
PC2.6B	400	500	12-20	750.0	600	23.9
PC4.2B	570	660	10-20	1325.0	430	21.9
PC40	570	750	5-10	1325.0	375	22.1

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>SKL Diesel</b>						
24/16	160	240	8	80-96.3	428	16.6-19.9
29/24	240	290	6-9	195-236.3	750-1000	23.8-24.0
48	320	480	6-8	121.3-139.7	428	8.8-10.1

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>Volvo Penta</b>						
TAMD 165 P/A/C	144	165	6	59.1-94.3	1800-2100	15.5-20.1
D9	120	138	6	61.3-70.9	2600	18.1-20.9
D12	131	150	6	49-95	1800-2300	16.2-24.5
D25	170	180	6	64.2-100.8	1300-1800	14.4-16.4
D30	170	220	6	64-116.8	1000-2000	13.1-15.4
D34	150	160	12	51.6-71.5	1600-2100	12.8-14.4
D49	170	180	12-16	55-86.7	1600-1650	10.1-15.4
D65	170	180	16	78.1-86.3	1600-1650	14.3-15.3

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>Wärtsilä</b>						
20	200	280	4-9	180-200	1000	24.6-28.0
26	260	320	6-18	310-340	900-1000	22.9-25.5
32	320	400	6-18	500.0	750	24.9
38B	380	475	6-16	725.0	600	27
46	460	580	6-18	1155.0	500-514	23.6-28.8
46F	460	580	6-16	1250.0	600	25.9
64	640	900	6-8	2010-2150	327-333	25-27.2

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>Wärtsilä (formerly Sulzer)</b>						
RTA48T	480	2000	5-8	820-1360	99-124	11-18.2
RTA48TB	480	2000	5-8	1020-1455	102-127	13.3-19
RTA/RT-flex50	500	2050	5-8	1160-1660	99-124	13.9-20.0
RTA52UB	520	1800	5-8	1120-1600	110-137	12.8-18.3
RTA58T	580	2416	5-8	1200-2000	84-115	10.9-18.3
RTA/RT-flex58TB	580	2416	5-8	1530-2180	84-105	13.7-19.5
RTA/RT-flex60CB	600	2250	5-8	1690-2420	91-114	14.0-20.0
RTA62U	620	2150	5-8	1165-2220	82-113	10-18.2
RTA62UB	620	2150	5-8	1600-2285	92-115	12.9-18.4
RTA/RT-flex68TB	680	2720	5-8	2150-3070	76-95	13.7-19.6
RTA/RT-flex68TD	680	2720	5-8	2190-3130	76-95	14.0-20.0
RTA72U	720	2500	5-8	1640-2990	70-97	10-18.3
RTA72UB	720	2500	5-8	2155-3080	79-99	12.8-18.3
RTA/RT-flex82C	820	2646	6-12	3620-4520	87-102	15.2-20.0
RTA/RT-flex82T	820	3375	6-9	3620-4520	68-80	15.2-20.0
RTA84C	840	2400	6-12	2840-4050	82-102	12.6-17.9
RTA84TB	840	3150	5-9	2130-3880	54-74	9.9-18.0
RTA/RT-flex84TD	840	3150	5-9	2940-4200	61-76	13.3-19.0
RTA/RT-flex96C	960	2500	6-14	4000-5720	92-102	13-18.6

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
<b>Yanmar Diesel</b>						
SY	127	154	6-8	82.8-88.3	2300	22.1-23.6
LA	148	165	6-12	51.3-74.6	1800-1900	12-16.6
L	150	165	6-16	67.4-83.4	1650-1950	14.9-17.6
GL	240	290	6-12	147.0	750	17.9
6G250L	250	290	6	162.0	750	18.2
6T260L	260	330	6	184.0	750	16.8
N260	260	360	6	245.2	750	20.5
EY	260	385	5-6	233-368	720-750	18.3-28.3
ZL	280	340	6-12	221.0	750	16.9
N280	280	380	6-8	239-306.5	1720	7.1-9.1
N330	330	440	6-8	367.8-413.8	1620	7.2-8.4
MF33	330	620	6	196.2-269.7	300	14.8-20.3

BRAND NAME	Bore	Stroke	Cyl#	kW/cyl	RPM	BMEP
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# telenor

# Training With Simulation Aboard USCGC Mackinaw

By Captain Robert Parsons, USCG (Ret.)

Months before the new Coast Guard Cutter Mackinaw was launched at Marinette Marine, and well over a year before the new cutter was to conduct a series of sea and ice trials, the officers and senior enlisted men and women of the "PRECOM" (pre-commissioning) crew were practicing and developing their navigation, seamanship and shiphandling skills using a full mission Bridge Simulator developed specifically for GLIB (Great Lakes Icebreaker Project) by Kongsberg Maritime Simulation, Inc. CDR James Morrison, GLIB Project Office at CG Headquarters, instrumental in the simulator procurement, stated, "Bridge simu-

lation is the most engaging way to meet instructional objectives. It is not a toy or video game. But to gain full benefit from the system the training exercises must be objective oriented with a specific training purpose".

The new Mackinaw (WLBB 30) replaces the aging 62-year-old cutter Mackinaw (WAGB 83), a mainstay in the U.S. icebreaker fleet operating in the Ninth Coast Guard District, which encompasses all of the Great Lakes. This new multi-mission 240 ft. cutter is a combination icebreaker and buoy tender. Beyond icebreaking support of commerce during the winter months, and servicing approximately 55 navigational and weather buoys, WLBB-30 will have

a host of additional duties. She will provide On-Scene Commander capability for major Search and Rescue (SAR) operations, and the ability to deploy an oil skimming system to respond to oil spills. Mackinaw will also conduct Law Enforcement tasks in support of Maritime Homeland Security.

Onboard navigation systems provided by Kongsberg Maritime include the Integrated Ship's Control System (ISCS) and Simrad Dynamic Positioning System (SDP). The ISCS includes the SEAMAP 10 Electronic Chart Display and Information System (ECDIS), DGPS, LORAN-C, Automatic Radar Plotting Aid (ARPA), Simrad Dynamic Positioning (SDP) System with

Captain Robert Parsons, USCG (Ret), past Commanding Officer of the POLAR STAR, holds a Master's Unlimited license. He is presently writing and consulting on polar marine issues from Bellevue, Washington.

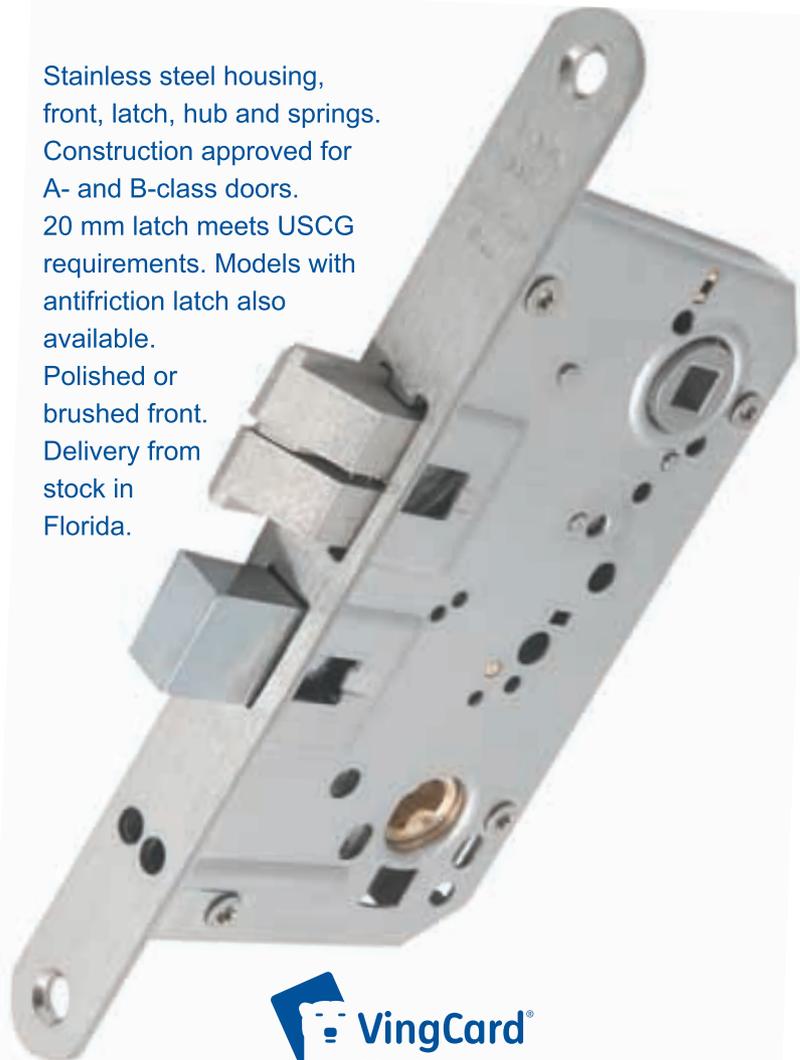


SDP/SJS Operator Terminals (OT) for remote use.

The propulsion plant driving Mackinaw is an azimuthing pod, which is new to the icebreaker fleet in the U.S., but which has been successfully deployed on Baltic icebreakers for the

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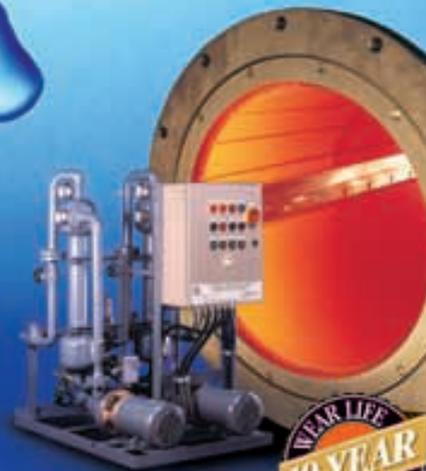


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USCGC Mackinaw prior to launch.



The training room.

past decade.

Maneuvering a vessel with pods is relatively easy as long as the deck officer continually remembers that azimuthing not only involves new and different controls, but that ship maneuvering is much more agile and immediate as compared to conventional ship maneuvering. As way of introduction to driving an azimuthing podded vessel, deck officers are often told to imagine they are driving an outboard motorboat with a simple tiller/throttle setup - Turn the tiller/throttle to the right and the boat (ship) will turn to port. Of course, a ship that uses dual pods, like Mackinaw, involves

additional levels of maneuvering combinations. The fully integrated Main Propulsion and Electrical plant on Mackinaw delivers 9,200 shp to the twin fixed pitched propeller ABB Azipods. A pair of controllers direct the pod movements and can be rotated to the desired direction through 360 degrees, with a lever to adjust ahead or astern power settings. The twin pods can be maneuvered independently or set-up to operate in unison with each other.

With so many new and sophisticated systems on WLBB-30, simulation has played a prominent role in the Cutter's training plan. Simulation has proven not

only to be an effective tool for equipment familiarization, but it has also provided the opportunity to practice shiphandling techniques as well as a way to validate cutter operational guidance.

The Kongsberg POLARIS Ship's Bridge Simulator system includes Radar/ARPA and ECDIS displays and controls emulating the actual Kongsberg shipboard equipment installed on the cutter's bridge. During the PRECOM period the system was set-up and operational at the shore facility and moved onto the cutter following launch, just prior to delivery. The system has been



installed on board in the "Training Room" a quiet space, where it is available for individual or bridge team training, with an instructor station to monitor and control the various exercises. The instructor can input various weather and environmental conditions and introduce new scenarios during the course of the exercise.

The bridge simulator was delivered with two Great Lakes geographical operating areas fully developed, which are the Mackinaw's primary icebreaking areas in Upper and Lower St Mary's River and Straits of Mackinac. More geographic operating areas can be developed in the future, based on the needs of the cutter. An example of shiphandling training includes practicing entering the locks at Sault Ste. Marie, in a wide variety of weather conditions including wind, current, and reduced visibility, in both day and night operations. The trainee can experience and develop his/her skill level in a multitude of situations. This form of training develops situational awareness and confidence in not only the cutter's capability but also in the individual's ability to handle the new cutter.

The fully integrated equipment in the Kongsberg simulator provides the deck officer, navigator or assistant the oppor-



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tunity to practice and develop their skills using bridge tools, such as radar and ECDIS, in the safe and efficient navigation of their cutter. The student can practice track routing, time and distance calculations, course corrections, with the cutter under the influence of a full range of environmental conditions. A special "E Coach" function provides the trainee the opportunity to independently practice various collision avoidance and maneuvering exercises which are based on maneuvering standards outlined in the COLREGS. The PRECOM crew developed various Deck Watch Officer Personal Qualification Standards (PQS), Ship Training Requirements (STRs), and Job Training Requirements (JTRs) using the simulator to validate newly developed training scenarios. Prior to the first time the cutter was underway members of the Great Lakes Pilots Association participated in five days of simulator training in preparation for Builder's dockside and sea trials, where the pilots are responsible for operation of the cutter. According to LT David Schuler, Operations Officer, "The system was also used to develop cutter navigation standards, especially to establish system defaults (i.e. depth alarm warning), which are currently used on the

bridge".

A support contract with Kongsberg includes two weeks of simulator training per year to bridge the knowledge gaps caused by personnel turnover and to maximize potential benefit of the system. And in the next few months, Kongsberg will be tasked with upgrading the bridge simulator to include the full range of dynamic positioning capability, including control of the Bow Thruster. "Early training has shown "mission rehearsal in Dynamic Positioning (DP) mode of the cutter's operation will be essential", according to CDR Morrison.

Having personally commanded two cutters operating on the Great Lakes (Mackinaw and Mariposa) over a five year period, in my experience "driving" the simulator approaching the Mackinac Bridge and up through Round Island Pass or up bound on the Lower St. Mary's River approaching the SOO locks, it was extremely realistic and it gives today's operators an advantage that didn't exist at the unit level just a few years ago. MACKINAW's deck officers can perfect their individual skills in a no harm environment and be much better prepared for the real thing when called upon to act.

## Azipod Specific Confined Space Training

As ABB Marine is the primary active supplier of podded propulsion systems, it has created a training program to ensure safe procedures for entering and working in the pods. The environment inside a pod is very demanding, as space is tight, with potential hazards.

In devising the course, the company had two goals: (1) to make sure that the customer knows how to perform a routine entry in to a pod, taking into account all risks, regulations, personnel and equipment; and (2) to prepare the customer for emergencies such as evacuating an injured person out of the pod.

To this end, an Azipod mock-up was built and the equivalent of a real size

Azipod (14 MW) was installed at the training facility. ABB joined forces with Meriturva, a state-owned organization providing training in ship simulation, fire fighting and basic safety.

The core of the training is divided into two parts: lectures and practical hands-on training. The lectures cover legislation, duties for all participants, entry procedures, traumatologic lectures and equipment presentations. The hands-on training begins with normal entries performed by the instructors. The level is raised on the move into maintenance tasks and to rescue situations. The key to working safely in the pod environment, the company stresses, is through proper planning. Even in a rescue situation, the task is easier if proper plans are already in place.

## Split Ship Management Training Center Upgraded

Simulators installed at Split Ship Management (SSM) training center have recently received an upgrade to version Transas 4000 - the latest technology available, which will make the training environments even more realistic.

"There are many desktop versions available which give only limited simulation but at the SSM Training Center,



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we use only Transas full mission simulators to train seafarers," said Kevin Brady, Marketing Manager for SSM. "This has the following key advantages: a complete range of functions for education, training and assessment activities; individual, group and team training under Instructor supervision; powerful Instructor Station capabilities to really test knowledge levels and develop skills; real ships equipment interface which gives true realism; instructor training programs, and integration of the full mission bridge simulator with the full mission engine simulator to give a 'total virtual ship' training environment."

### Transas to Patent Liquid Cargo Handling Simulator

Transas announced a patent application for its Liquid Cargo Handling Simulator, intended for training tanker and terminal operators. The application was lodged in the Russian State Register of Inventions. The system, which is one of the leading company simulation developments, was registered with priority from August 16, 2004.

This is, fundamentally, a new simulator, with a range of technological solutions, such as: named data server, network message router, logger and

interactive instructor software with set of slave tasks.

The Liquid Cargo Handling Simulator could be used for studying the tanker and terminal facilities, its machinery and systems, as well as for studying the operation and performance of systems and units in normal, accident and post-accident conditions.

Some features of the Transas Liquid Cargo Handling Simulator include:

- **Graphics User Interface:** The interface is optimized for familiarization with the entire system operating principles, as well as for acquiring practical skills for handling the equipment. The main tanker units are implemented as 3-D objects, cross-sections of individual assemblies are shown.
- **Load Control System.** The Transas simulators use LCS, which is in operation on board 900 ships worldwide.
- **Different Cargo Types.** Different cargo types can be selected from the available database.
- **Accurate Mathematical Model.** The mathematical model in use allows processes to be accelerated without detriment to the physical realism, whereas the training time is reduced.

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### Ship Handling, Bridge Op Training Simulator Opens in Hamburg

Northrop Grumman opened a new ship handling and bridge operation training simulator in its Sperry Marine training center in Hamburg, Germany. "This is the first Sperry Marine training center in Europe providing comprehensive programs for shiphandling and bridge operation instruction," said J. Nolasco DaCunha, director of Northrop Grumman's Sperry Marine Systems. "Its purpose is to provide watchstanders with training on Sperry Marine products in a controlled environment with certified, expert instructors." The 160 sq. m. training center offers instruction in all aspects of ship handling and bridge operation. The courses include classroom instruction with multiple computer workstations and a complete integrated bridge system (IBS) and ship simulator. The new simulator system includes three projectors that provide a full-motion seascape on a 4.2-m wide, 120-degree panoramic screen.

The Sperry Marine multi-console IBS installation mimics a typical ship's bridge, including electronic chart display and information system (ECDIS) with Sperry Marine's proprietary Voyage Management System, radars, adaptive autopilot, manual steering, engine and bow thruster controls, heading and speed indicators, and other related systems.

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# TWIC Zeal Untempered

Dennis Bryant, Senior Counsel,  
Holland & Knight LLC

After an extended delay, the Transportation Security Administration (TSA) is moving forward with its plan to implement the transportation worker identification credential (TWIC). The zeal displayed by the TSA may, though, interfere with the orderly and efficient development of the program, may impose excess costs upon the regulated community, and may not materially enhance the maritime security of the United States.

The requirement for a TWIC (or transportation security card) originated with the Maritime Transportation Security Act of 2002 (MTSA). After almost four years of planning, development, and prototype testing, TSA is affording the regulated community only 45 days to review, digest, and comment on its extensive, complex, and far-reaching proposal.

As of this writing, a number of comments have been submitted to the docket, which remains open until July 6, 2006. This article will attempt to organize and summarize some of those comments, all of which deserve careful consideration.

**Opportunity for input:** Numerous persons complained that there were too few public meetings (only four were scheduled); that the meeting locations were inconvenient for many segments of the industry; and that the 45-day comment period was far too short for preparation and submittal of meaningful comments. Guidance issued by the Office of Management and Budget (OMB) recommends that the public be provided a minimum of 90 days to review and submit comments on proposed rulemakings. TSA does not fully explain why it has provided only this truncated review period.

**Small business impact:** Federal law requires agencies involved in rulemaking to consider and minimize to the maximum extent feasible the impact of a rulemaking on small businesses that might be included within the ambit of the process. TSA, in its proposed rulemaking, lamely asserts: "At this time, we have not determined if this proposed rule would have a significant economic impact on a substantial number of small entities." Such an assertion leads one to wonder how much analysis actually went into this rulemaking and how much was just filling in the blanks to get the document into print.

Close review of the transportation security card provision in the MTSA reveals that the TSA has considerable discretion regarding determination of what constitutes a "secure area" for a vessel or waterfront facility. There is nothing in the statute that would prohibit the TSA from determining that, for a small vessel and a small facility, there is no secure area. Indeed, for an open passenger vessel used for whale watching, such a conclusion seems logically mandated. If there is no secure area, then the basic TWIC requirement does not apply. Many small businesses could be exempted from the expenses inherent in the TWIC program if logic is

allowed to prevail.

**Cost to mariners/employees:** TSA estimates that the user fee to be assessed to mariners and employees who come within the TWIC regulation will be approximately \$139 per person. This does not include expenses incurred in traveling to the enrollment site to apply for the card and then returning 60 days or so later to be issued the card. If the individual has to travel a significant distance, room and board expenses will also be incurred. Finally, during these travel periods, the individual will not be performing his or her usual work and, thus, may lose income. If the employer pays these expenses, that will benefit the individual, but will still incur what is sometimes called a "lost opportunity" cost for society as a whole as no productive work is being performed. The cost-benefit analysis accompanying the proposed rulemaking fails to fully address these costs.

**Delays in hiring:** Many companies commented that the process of applying for and obtaining a TWIC is inherently slow - taking upwards of 60 days in usual cases, according to TSA estimates. In today's employment environment, marine employers will be placed at a significant disadvantage to other employers if new workers can not be brought on board more rapidly. Companies have suggested that TSA include in the regulation a provision for probationary employees, who could start work while awaiting issuance of the permanent TWIC.

**Technology standard:** The rulemaking envisions the TWIC utilizing something called the FIPS 201 standard for encryption and retrieval of the biometric data that identifies the individual to whom the card is issued. Several comments indicate, though, that the FIPS 201 standard is still a work in progress. If so, it causes one to wonder whether the rulemaking is premature. This is particularly true given that the contract for card production has only recently been solicited and not yet awarded.

**Card reader feasibility:** Considerable doubt exists as to whether a machine can be designed to read the TWIC cards in a rapid and reliable manner when used in the typical marine environment. It is one thing to operate card readers in a grocery store - and even then we have all seen customers have difficulty or for the computer located at a distance site to be unable to keep up with all the data being in-put by all the various users. The environment on a ship or at a ship repair facility or oil terminal is significantly more onerous. Humidity, salt, dirt, and grease are only some of the factors with which the card reader will have to cope. Many of the job sites, particularly for ships, will not have broadband or even landline telephone links. Thus, the card reader will have to rely on wireless communication. This will not only be slower than broadband, but also will be more subject to disruption and interception. One can only imagine the frustration and chaos that will ensue when 100 or more

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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shipyard workers want to all check out at the same time at the end of their shift and try to utilize the card readers to analyze their less than pristine TWIC cards.

**Prototype testing:** Several comments question whether the prototype testing that was undertaken was realistic, thorough, and sufficient. There is some indication that the TWIC process proposed in the rulemak-

ing differs noticeably from the process that was involved in the testing. If so, then what is being proposed has not been tested. If it hasn't been tested, how does TSA know that it will work after hundreds of thousands of cards and thousands of card readers have been purchased by individuals and companies?

**Disadvantage re foreign competition:** For various reasons, the TWIC regulation, as proposed, would apply only to US vessels and facilities. The question has been raised regarding whether this places US vessels at a disadvantage regarding foreign vessels. Under the regulation, a US vessel would have to examine the TWIC for each longshore worker coming on board to handle cargo. A foreign vessel would be under no such obligation. Additionally, as written, the regulation would apply to a US vessel in a foreign port - even though none of the workers there would have TWIC cards. There is no easy solution to this paradox, but it deserves consideration.

**Recordkeeping:** The regulation proposes that the vessels and facilities to which it applies develop extensive records regarding who is on the vessel or facility at any particular time and that such records be maintained for at least two years and made available to government representatives upon request. One has to wonder whether the drafters of the regulation are being paid a stipend by the big software companies.

In summary, while there are some good points to the TWIC concept, this particular proposal appears to go way overboard. These vessels and facilities are not nuclear weapons plants. Why should they be required to institute security systems that are not utilized by most US military installations? It is time to go back to basics. TSA should develop a new proposal that meets several basic parameters: (1) comply with the statute without excess; (2) utilize proven technology throughout the process; and (3) rely on a risk-based formula weighing threat, vulnerability, and consequence. TSA should temper its zeal to accomplish the mission with some common sense regarding the distinction between the technologically possible and the truly practicable.

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## Shine Micro Debuts New AIS/Comm Devices

Shine Micro introduced two new communications products — the Radar Plus SM1610 and Blue Force Tracking SM162-BFT — designed to meet the need for on-the-water, over-the-air automatic identification and secure communications, according to Shine Micro President Mark Johnson. The Radar Plus SM1610 AIS is designed as a rugged, mast-mounted antenna amplifier and pilot-house-mounted receiver designed for the maritime surveillance market, designed to dramatically improve the range of other proven Shine Micro AIS receiver products and build on the success of the SL161R used in the Harris Regional Florida Coast AIS demonstration system. With its proprietary tracking range enhancements achieved through NOISON demodulator technology (patent pending), Shine Micro has implemented techniques which demodulate AIS packets both forward and backward for reception of noisy, weak signals. Blue Force Tracker combines GPS, an AIS receiver, a Multi Use Radio Service (MURS) VHF receiver and a MURS secure transmitter all in a single 25-in. weather-resistant enclosure. Designed for law enforcement, USCG, harbor patrol, search-and-rescue and other agencies, this surveillance and communications system allows official users to see AIS marine traffic, yet not be seen unless authorized. Blue Force Tracker uses a combination of AIS VHF radio channels and the MURS group of VHF frequencies.

Circle 12 on Reader Service Card

## SSNW Adds Second Boat

Security Services Northwest (SSNW) added a second boat to its maritime counterterrorism group. Manufactured by Safe Boats International, the boat is designed, built, and outfitted for the maritime security mission. It is capable of all weather operations and will be equipped with the

most current sensors, including an underwater detection capability as needed. The boat will be manned with counter assault team members commensurate with the mission. It is constructed in such a manner as to be transportable anywhere in the world in a C-130 or larger aircraft, or can be transported over land on its own trailer.

Circle 13 on Reader Service Card

## Siemens Adds Components To RFID System

Three new components have been added to Siemens Energy & Automation's SIMATIC RF600 RFID line, a coordinated system of matched hardware and software components using Ultra High Frequency (UHF) technology (860 to 956 megahertz frequencies). In addition, Siemens recent acquisition of RVSI Acuity CiMatrix, a leading manufacturer of 2-D symbology for permanent item marking (UID), enhances the company's Department of Defense (DoD) mandated compliance and brand protection. The new components — the SIMATIC RF610 mobile UHF reader, SIMATIC RF620L Smartlabels, and SIMATIC IT Production Modeler — are now available in the U.S. as part of the RF600 line that is designed to reduce storage costs and enhance supply chain repeatability from a single platform.

The SIMATIC RF610 mobile UHF reader functions as a plug in card for a number of mobile devices, including PCs, notebooks, and PDAs. The mobile reader can be used simultaneously with barcode scanners. Supporting EPC and ISO standards, the reader operates online and offline.

The new SIMATIC RF620L Smartlabels are attached to transport units, cardboard containers, and goods and may be used in a variety of ways, including distribution logics and goods identification. Each Smartlabel has a unique identifier (EPC Code 96 bit).

Circle 14 on Reader Service Card

## A Synergy That Continues to Grow

# U.S. - Canadian Maritime Security

By Joe DiRenzo III and Chris Doane

The maritime transportation system along the U.S. - Canadian border is critical to the economic health of these two nations and responsibility for its security is shared by both. The significance of the U.S. and Canadian border, and the effect that a successful maritime terrorist attack would have was highlighted by then Coast Guard Commandant Admiral Tom Collins, during a speech in Cleveland last year.

Admiral Collins advocated closer interoperability with Canada when he stated, "...take a moment to picture the Great Lakes system and the St Lawrence Seaway, which together form the sole maritime transportation route between the Atlantic Ocean, and five of the top 50 ranked strategic ports...imagine the Detroit River where annually billions of dollars in trade pass between the U.S. and Canada. Now, imagine the unimaginable - a maritime catastrophe - a weapon of mass effect - in any one of these areas. In a split second - our country's economy and national security would suffer a very serious blow." Clearly, Canada and the U.S. have a vested interest in developing a joint maritime security strategy to protect this vital infrastructure.

The foundation for this joint effort between the United States and Canada is the special bond between the countries. The cross-border freedom of movement Canadians and Americans enjoy highlights the closeness, familiarity and openness that have transcended World Wars, the events of 9-11 and natural disasters. For example, it was Canada that stepped up to the plate following Hurricane Katrina and provided helicopters and crews to support Search and Rescue operations in New England as Coast Guard helicopters were moved south to provide a response that eventually rescued more than 34,000 individuals.

For decades Canada and the United States have coordinated in matters of National Defense and environmental protection. During the cold war Canada and the U.S. formed NORAD to monitor and protect against the nuclear threat posed by the Soviet Union. Canadian warships continue to routinely deploy with U.S. carrier strike groups to maintain the ability for joint defense operations. The two nations also developed and exercised joint plans for responding to oil spills along the border and established agreements for management of adjacent fishing grounds.

Today, the Global War on Terrorism has become



During a tactical demonstration at the Port of Anchorage the Coast Guard Marine Safety and Security Team simulated protection of three Canadian Navy Kingston Class vessels against a water based aggressor. The aggressor was simulated by another MSST vessel. The demonstration was for the benefit of Senator Lisa Murkowski's staffers who paid a visit to the unit Tuesday. The Canadian Navy vessels were in Anchorage for a port call during training. (USCG photo by PA2 Sara Francis)

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another mission where the two nations have joined to combat a common threat. Through exercises such as the recently concluded "Ardent Sentry" the two countries are developing and refining plans to respond to terrorism and improve their interoperability. During Ardent Sentry, Canadian and U.S. agencies jointly reacted to scenarios such as

a simulated "dirty bomb" (radioactive IED) explosion in Windsor, Ontario that sits across the river from Detroit. Additional scenarios included simulated terrorist bombings in Detroit including one which caused a sympathetic explosion of railroad cars with chlorine and phosgene gas. Canadian and U.S. law enforcement, defense and emergency

response entities worked together to respond to these "attacks" to mitigate the consequences. Cooperation like this can best be described as the ultimate "unity of effort".

So what exactly has been occurring in the world of maritime security between the United States and Canada, especially as the national attention is shifted to

the southern border with Mexico?

For starters the United States Customs and Border Protection (CBP) and Canadian Customs have worked closely together implementing both the Customs-Trade Partnership Against Terrorism (C-TPAT) and the Container Security Initiative (CSI). C-TPAT involves shippers who voluntarily implement security standards and work with the CBP to get containers and cargo moved quickly, including those brought through the St. Lawrence Seaway working with Canada Border Services Agency (CBSA). Canada has also initiated a complimentary program called the Customs Self Assessment and Partners in Protection (CSA/PIP), which is also designed to work supply chain security issues. The two programs are both working extremely well in this joint arena.

CSI is a program designed to place U.S. CBP officers "in country" to work with host nation officials to identify containers which need further inspection. The program has four specific goals, according to CBP, including:

- Identify high-risk containers. CBP uses automated targeting tools to identify containers that pose a potential risk for terrorism, based on advance information and strategic intelligence.
- Prescreen and evaluate containers before they are shipped. Containers are screened as early in the supply chain as possible, generally at the port of departure.
- Use technology to prescreen high-risk containers to ensure that screening can be done rapidly without slowing down the movement of trade. This technology includes large-scale X-ray and gamma ray machines and radiation detection devices.
- Use smarter, more secure containers, which will allow CBP officers at United States ports of arrival to identify containers that have been tampered with during transit."

CBP uses automated targeting tools in support of CSI to identify containers that pose a potential risk for terrorism based on advance information and strategic intelligence. Currently three ports within Canada are participants in CSI including Montreal, Vancouver & Halifax, Canada.

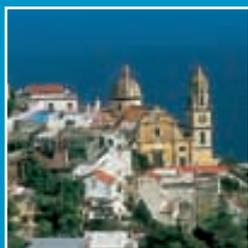
In addition to the CSA/PIP program and participation in C-TPAT and CSI, on April 22, 2005 Canada announced a \$300-million, five-year series of initiative packages to further enhance the security of Canada's marine transportation system and maritime borders. The program requires interoperability with the United States on all common borders



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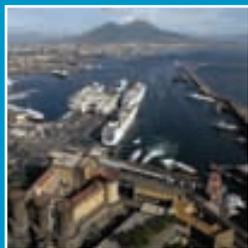
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further enhancing security.

Perhaps the most dramatic success has been the creation of the Joint Initial Verification Team or JIVT, a partnering effort between the U.S. Coast Guard and Transport Canada. As described earlier, vessels transiting the St. Lawrence Seaway and the Great Lakes, even those bound solely for Canadian ports or U.S. ports on the Great Lakes, are a security concern to both nations. With the July 1, 2004 implementation of the International Maritime Organization's International Ship and Port Security (ISPS) Code, it became critical that U.S. Coast Guard and Canadian inspectors board vessels as far from the Great Lakes as possible to get a general assurance that vessels entering the Great Lakes were ISPS compliant - enter the JIVT.

Commander James McLaughlin, Chief of Inspections and Investigations Branch at the Ninth Coast Guard District explained the program this way. "The JIVT is comprised of marine inspectors from both countries who conduct joint security compliance examinations in Montreal, Canada on all vessels that intend to enter the St. Lawrence Seaway (SLS). The inspectors jointly examine vessels for compliance with the new International Ship and Port Facility Security (ISPS) Code regulations." Continued McLaughlin, "Establishment of the JIVT was critical because a vessel en route to its destination port in the Great Lakes would otherwise transit past numerous key assets and infrastructure within the SLS critical to both the U.S. and Canada and through hundreds of miles of congested and sensitive waters before a qualified U.S. Coast Guard or Transport Canada inspector would examine it for compliance with the ISPS Code. In some cases, vessels would have transited through the locks at Sault Ste. Marie before they would be examined. The Great Lakes system has numerous choke points that are susceptible to major damage. Any incident resulting in the blockage of one of these choke points would jeopardize the entire Great Lakes Maritime Transportation System."

Why has the JIVT process been so successful?

"By conducting the examination in Montreal, the team is able to jointly determine if a vessel poses an unacceptable risk to the U.S. or Canada. In addition, by conducting a joint exam in Montreal, we are able to leverage resources both in the U.S. and Canada. Many vessels entering the Lakes make port calls in both the U.S. and Canada, which, without the JIVT, would necessitate separate security compliance examinations in the U.S. and Canada. Also, by conducting the examinations in Montreal, we eliminate the need for an extended examination by the U.S. Coast Guard at the vessel's first U.S. port call," explains McLaughlin. As a result, the final examination at the destination port requires only 15-20 minutes of an inspector's time to verify the vessel and the receiving facility have properly agreed to their respective security responsibilities. Without the JIVT examination, this final examination would take approximately three to four hours to complete."

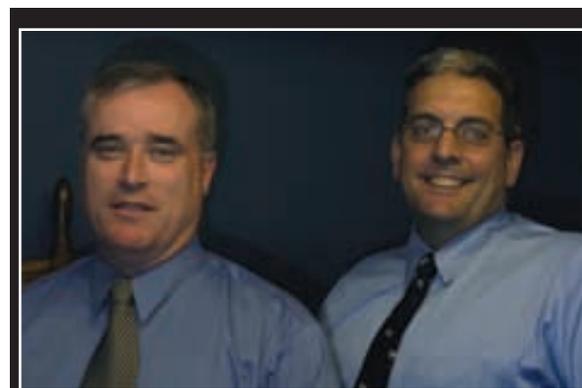
On July 1, 2004, shortly after midnight, the M/V Vectis Harrier became the first vessel boarded by the JIVT. Within the first 15 days of the program, one vessel, the M/V Scoter, after notification of the examination, elected not to enter the Great Lakes, thereby avoiding being examined and returned to sea. During

the period of July 1, 2004, through May 17, 2006, the JIVT has boarded over 300 foreign vessels in Montreal, Canada. Since inception, more than 10 vessels have been denied entry into the Great Lakes as a result of JIVT examinations.

"In 2006, we have expanded the scope of the JIVT examinations by including a security drill to ensure vessels' crew are adequately trained to handle a security breach. In addition, Transport Canada has agreed to allow U.S. Coast Guard inspectors to observe Port State Control exams conducted by Transport Canada Marine Safety inspectors in Montreal. Our future goal is to establish a single examination point, in the vicinity of Montreal, where all vessels can be jointly examined by all applicable U.S. and Canadian agencies prior to entry into the SLS and Great Lakes. In addition to the benefits of leveraging both Canadian and U.S. resources and eliminating duplication, providing a single vessel examination area will provide a significant benefit to the maritime industry," says McLaughlin.

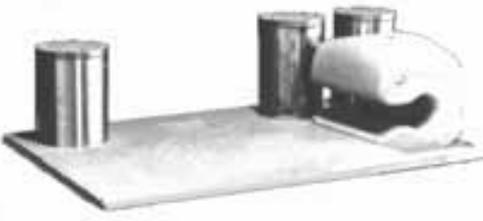
As with the World Wars and the Cold War, the Global War on Terrorism has brought Canada and the U.S. together to combat a common threat to their shared borders. This is particularly true in the maritime domain upon which both countries' economies are so dependent. The partnership between the maritime security agencies of the two nations has reached unparalleled heights. The maritime security cooperation

between the United States and Canada is a model of international synergy that just keeps getting better.



Chris Doane (left) and Joe DiRenzo III are both retired Coast Guard officers, who are currently Coast Guard civilians stationed at Coast Guard Atlantic Area in Portsmouth Virginia. Frequent contributors to both Maritime Reporter and Marine News they have written and lectured extensively on port and maritime security issues.

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## CFO Resigns

A/S Steamship Co. Torm, a Danish shipping company, said Chief Financial Officer Klaus Nyborg resigned and accepted a position with Pacific Basin Shipping Ltd. in Hong Kong. Copenhagen-based A/S Steamship has a combined fleet of 100 tankers and bulk carriers.

## New UKHO Chief Exec

Mike Robinson (42) has been appointed Chief Executive of the UK Hydrographic Office (UKHO) from July 19. Robinson succeeds Dr. Wyn Williams, who retires after five years in the post.



## Ginnetti Promoted

Sea Recovery Corporation has designated Tom Ginnetti to manage its new Commercial Sales Division. Under his supervision, commercial sales have already rapidly increased.



## GL Award for World's Largest Container Ship

Kostis Constantakopoulos, Chairman Costamare, Guo Dasong, Vice President of COSCO Shipyard Group., and Capt. Li Keqiang, Chief Representative of



Dr. Hermann J. Klein, Kostis Constantakopoulos, Capt. Li Keqiang and Mr. Guo Dasong celebrate the world's largest container vessel at the Germanischer Lloyd booth at Posidonia in Greece.

Cosco Group in Greece, both on behalf of COSCO, received an award honoring the first-class cooperation in the world's largest containerships from Dr. Hermann J. Klein, Member of the Executive Board Germanischer Lloyd. Representatives including M. Manos (Costamare), D. Lemonidis and A. Lemonidis (CIEL) and Li Rong (COSCO Shipyard) met with Torsten Schramm and Athanasios Reisopoulos (GL) at the Germanischer Lloyd booth at Posidonia to celebrate a fruitful technical partnership.

The largest containership operator in Greece, Costamare Shipping Co. S.A., has currently the world biggest containerships in service: a quintet of 9,500 TEU vessels built by Hyundai Heavy Industries in Korea. Chartered to the Chinese shipping company COSCO and classed by Germanischer Lloyd, the vessels are 350 m long, 42.8 m wide and will be capable of a 25.5 knot service speed. The last sister vessel will be delivered in July.

## Foss Crew Wins Award

Captain Sam Nelson and crew of the Foss Maritime Company tugboat Justine Foss received the Lifesaving Award from the Seamen's Church Institute at their annual Silver Bell Dinner on June 1 in New York. United States Coast Guard Commandant Admiral Thad Allen was in attendance and personally congratulated Captain Nelson. Captain Nelson and his crew received the award for their heroic efforts in response to the needs of the crew of the tugboat Valour and the barge M-192 while in heavy weather and rough seas on January 18, 2006 off the coast of Cape Hatteras, North Carolina. "Captain Nelson and his crew, through their excellent seamanship skills, were able to rescue five men from the water and regain control of the laden tank barge during darkness and severe sea conditions," said Paul Gallagher, Director of Sales - Marine Transportation, Foss Maritime. "There is bravery at work each day," he continued. In addition, on Friday, June 9, Don McElroy, Foss Maritime Vice President of Marine Transportation, was presented with top honors at the Jones F. Devlin Ship Safety Achievement Awards Luncheon held by the Chamber of Shipping of America at the Hilton Riverside Hotel in New Orleans in honor of the JUSTINE FOSS and her rescue of the crew of the VALOUR.



Captain Nelson stands with his wife, Laurie, to receive the Lifesaving Award from the Seamen's Church Institute, Admiral Thad Allen, U.S. Coast Guard Commandant, presented the award on June 1.

## Costa Orders Cruise Ships

Costa Crociere SpA announced that a new 92,700-ton cruise ship was ordered with an option for a sister ship. The new ships will be built by Fincantieri at Marghera shipyard and will have a basis-two capacity of 2,260 each. The first ship is scheduled to enter service in spring 2009. If the option is exercised, the second ship is slated to debut in fall 2010. The all-in cost for each vessel will be approximately \$528.6m. The new Costa ships will have a total of 1,130 cabins, of which 772 with private balcony. A new order has also been announced for AIDA Cruises, which is a branch of Costa Crociere SpA. The new 68,500-ton ship, with a basis-two capacity of 2,050, will be built by Germany's Meyer Werft yard. Scheduled delivery is spring 2010. The vessel's all-in cost will be approximately \$415.3m and marks the fourth 68,500-ton vessel ordered for the brand in just the past 19 months.

## Two New Water Taxis for New York

Gladding-Hearn Shipbuilding is building two more sister-ships for the New York Harbor ferry service company. The first will be delivered this summer, the second next spring. Like the Seymour B. Durst and Sam Holmes before it, the bright yellow, all-aluminum catamarans will measure 72 ft. (22 m) long and 27.3 ft. (8.3 m) abeam, and draw 5 ft. (1.5 m). Each will be USCG-certified to carry 149 passengers but limited to only 100 passengers when operating at New York City water taxi docks. The vessels will be powered by two Cummins QSK 19-M diesel engines, each rated at 800 Bhp at 2,100 rpm. The engines will drive five-blade Ni-BR-Al (nickel-bronze-aluminum) Bruntons propellers via Twin Disc MGX 5145SC "Quick Shift" gearboxes and EC-300 control systems. Top speed will be 26 knots with a load of 11.5 tons.

## Aker Yards, Damen Plan Joint Venture

Aker Yards and Damen Shipyards Group are planning to establish a joint venture owning the Damen Shipyards Okean yard in Mykolayiv, Ukraine. The Okean yard is able to build a variety of vessels, steel sections for all the three business areas of Aker Yards, as well as the existing Damen range of vessels.

For Aker Yards ownership share it will pay \$12.6m cash at closing. Further payments will be dependent on financial performance of the yard. The transaction is subject to approval.

## USCG Names 2006 Benkert Award Winners

The Coast Guard has awarded the 2006 William M. Benkert Environmental Awards, presented during the American Petroleum Institute Tanker Conference on June 26 in San Diego.

The William M. Benkert Award is the premier national award for excellence in marine environmental protection. The award recognizes vessel and facility operators who have implemented marine environmental protection programs that go beyond mere compliance with industrial and regulatory standards. The award is named in honor of Rear Admiral William M. Benkert (1923-1989), a distinguished Coast Guard officer widely known for his leadership and vision in marine environmental protection. The 2006 Benkert Award selectees are:

### Large Business Facilities:

Dow Chemical, Freeport, Texas (Osprey)  
British Petroleum Cooper River, Wando, S. C. (Gold)  
Odfjell Terminals, Houston, Texas (Bronze)  
Todd Shipyard, Seattle, Wash. (Honorable Mention)

### Large Business Vessels:

Ocean Shipholdings, Inc (OSI), Houston, Texas (Silver)  
Marathon Petroleum Company, Ashland, Ky. (Bronze)  
Matson Navigation Company, Oakland, Calif. (Bronze)

### Large Business Foreign Vessels:

British Petroleum Shipping, U. K. (Silver)

### Small Business Vessels:

U. S. Shipping Partners, Edison, N.J. (Honorable Mention)

### Small Business Facilities:

Marathon, Louisville, Ky. (Honorable Mention)  
Marathon, North Bend, Ohio (Honorable Mention)

### Special Small Business:

Southeast Petroleum Resources Org., Inc., Ketchikan, Alaska (Honorable Mention)

## Alion to Acquire Certain Assets of Anteon

Alion Science and Technology signed an agreement to purchase certain assets of Anteon Corporation's program management and engineering services business. This business unit of approximately 900 employees provides substantial technical and operational support to the DoD, in particular the U.S. Navy and Air Force. It is anticipated that the acquisition will be completed by June 30, 2006.

## Oglebay Norton Sells Six

Oglebay Norton Marine Services Company, LLC, completed the sale of six of its nine remaining self-unloading freighters for \$120 million to American Steamship Company, a subsidiary of GATX Corp. Acquired were: M/V Oglebay Norton, M/V Columbia Star, S/S Armco, S/S Middletown, S/S Courtney Burton, and M/V Fred R. White. The company is also progressing with its negotiations for the sale of the M/V David Z. Norton and M/V Wolverine and the transfer of the its leasehold interest in the M/V Earl W. Oglebay to an unidentified purchaser.

## Sale of McMurdo Division

McMurdo announced the conditional sale of its Survivor Location Lights business, for a cash consideration of \$5.25m, to Danish owned company Daniamant Ltd.

## Stealthgas Expands Fleet

Stealthgas entered into an agreement to acquire its 28th LPG carrier, M/V Batangas, for \$9.4m with expected delivery in early July 2006. Batangas is a Fully-Pressurized LPG carrier built in Japan in 1995 with a capacity of 3,300 cbm. Upon delivery, it will be immediately deployed under a bareboat charter to a major gas trader at a rate of \$106,000 per calendar month until July 2008.

## MC Shipping Gets Tanker

MC Shipping agreed to acquire a liquefied petroleum gas (LPG) tanker from the A.P. Moller - Maersk Group of Denmark.

The vessel, Hans Maersk is a 1993-built semi-refrigerated LPG carrier of 20,700 cbm capacity. The acquisition is being funded out of current cash holdings and a bank loan. The vessel is expected to be delivered before July 31, 2006.

## Surcharge on Antifoulings as Copper Price Spikes

Following the announcement in February that unprecedented raw material costs had created a dramatic new cost base for the marine coatings market, the continued record rise in the price of metals has now forced International Paint to apply a surcharge on all copper containing biocidal antifoulings.

Brian Smith, International Paint's Marine and Protective Coatings Commercial Director, said "Copper is a key raw material used extensively in biocidal antifoulings. The amount of copper contained in these product types means that it accounts for a significant proportion of product cost. While the price of copper has steadily increased four fold in the last 36 months, recent price rises have been dramatic; from \$4,000 per ton in the last quarter of 2005 to a peak of over \$8,500 per ton last month. To date, International Paint has largely absorbed these increases. Unfortunately, due to the severity of the increases since the start of the year, we are left with no alternative but to pass some of our additional costs onto our customers in the form of a surcharge. It is hoped that this surcharge will be a temporary measure and that the current cost of copper is a market spike driven by unprecedented strong demand and constrained supply."

## Samsung Gets Orders

Samsung Heavy Industries Co., has received orders for 14 container ships worth \$1.5 billion from three companies including Panama's Naviera Daniela SA and Greece's Danaos Shipping Co. Samsung Heavy will deliver the ships by November 2009.

## Omega Takes Delivery

Omega Navigation Enterprises, Inc. has taken delivery of its second Panamax (LR1) double hull product tanker, Everhard Schulte, to be renamed the Omega King. Omega King is 74,999 dwt, built by Hyundai Heavy Industries in 2004. The acquisition was funded by in part from the net proceeds of the company's initial public offering and debt under a senior secured credit facility provided by HSH-Nordbank AG.

## Sonatrach, Kawasaki in Tanker Deal

A new joint venture of Algerian energy group Sonatrach and Japan's Kawasaki Shipbuilding Corporation signed a \$120 million deal to buy a tanker from a Chinese-Japanese firm, Sonatrach said.

The 50/50 venture, called NOVL, signed the purchase agreement with NACKS Shipyard, a joint venture between Chinese company COSCO and Kawasaki.

## Rutter Books VDR Order

Rutter Technologies has won contracts to supply its Voyage Data Recorder (VDR) to the Norwegian Kristian Gerhard Jebsen (KGJS) fleet and to the Greek shipping group comprised of Kristen Navigation Inc., Anangel Maritime Services Inc., Alpha Tankers & Freighters International Ltd. Under two separate contracts KGJS will order 24 VDRs and the Greek fleet owners 56, for a total of 80 units.

## ZF Establishes Joint Venture in China

At the headquarters of ZF Friedrichshafen AG, the management of ZF and of Nanjing Highspeed & Accurate Gear (Group) Co. Ltd. (NGC) signed a contract to establish the ZF Nanjing Marine Propulsion Co. Ltd. (ZF-NMP). The company will be based in Nanjing, P.R. China, owned 60 percent by ZF (China) Investment Co. Ltd., Shanghai (a subsidiary of ZF Friedrichshafen AG) and 40 percent by NGC. The new company will assemble and market ZF Marine's range of heavy duty transmissions for application in workboats and ocean-going commercial vessels powered by engines up to 18,500 hp. The ZF-NMP factory building is currently under construction and assembly of transmissions will commence in the near future, after all governmental permissions have been received.



(L to R): Roland Heil, CEO ZF Marine Group, Wolfgang Vogel, Board Director, ZF Friedrichshafen AG, and Yueming Hu, President NGC.

## New Alfa Laval Facility in China

Alfa Laval is expanding its facilities to begin assembly of S-separators in Jiang Yin, China, 148 km northwest of Shanghai. The S-separator is a centrifuge for cleaning fuel and lubricating oils. With 12 years of manufacturing experience in China, Alfa Laval already produces nearly 85,000 small and large heat exchangers every year in Jiang Yin. "Over the years, we have been increasing production at our Jiang Yin facility. The company has been producing heat exchangers for non-marine applications for both domestic use and export since 1994," said Peter Carlberg, General Manager of Alfa Laval Marine & Diesel. Since March 2005 the factory has also produced 1,000 tank cleaning machines for the marine market.

## Aker Yards Enters Chem Tanker Market

Aker Yards signed an agreement with Kleven Maritime to acquire Kleven Florø AS, and Kleven Design AS. Both entities are located in Florø, Norway. The previously announced joint venture with Damen Shipyard Group in Ukraine creates an opportunity for Aker Yards to develop a new line of chemical carriers in combination with Kleven tanker know-how. Aker Yards has agreed to acquire Kleven Florø and Kleven Design at a price of \$9.5m including debt, based on a working capital of zero. In addition there will be further payments based on performance on existing order backlog and new orders in the coming three years. The order intake part of the payments is capped at \$5.7m. Kleven Florø has approximately 300 employees, and there are 30 engineers at Kleven Design. The turnover of Kleven Florø and Kleven Design was \$55.3m in 2005. The orderbook consists of one juice tanker and two chemical tankers at a total value of approximately \$205.4m.

## MFI Wins Contract

Marine Fenders International, Inc., a manufacturer of marine fendering systems, was selected to supply our Ocean Guard Netless foam filled marine fender system for the one of the harshest marine environments in the world, the DeLong Pier at the Thule Air Base in Greenland. The project work consists of jacketing deteriorated north row caissons, installation of a galvanic cathodic protection system, coating of the south row caisson to barge interface, the installation of a Ocean Guard Netless foam filled marine fender system and the repair of a damaged barge unit.

## Bailey Makes Changes

Bailey Refrigeration Co. announced the appointment of Donald Booth to the Branch Manager position in Virginia Beach, VA. Bailey welcomes both Don and his wife Karen to leadership positions at the Virginia Beach branch. Don and Karen have been a team in marine refrigeration and air conditioning for more than 30 years. Bailey also was awarded a \$16m contract to supply and install new ship's stores systems for 40 U.S. Coast Guard Cutters.

## Vacon Extends Factory

AC drive manufacturer Vacon has extended its facilities in Vaasa, Finland. The extension parts cover a floor area of 7,100 sq. m. in total, which is divided into Producta I and a middle section connecting Producta I with the old production facilities. 3,400 sq. m., i.e. about 50% of the facilities is reserved for Vacon and the rest is used by DHL, responsible for Vacon's logistics services. The facilities Vacon leases include production lines, office space, personnel and storage facilities and a new air-raided shelter. The Producta I extension part was built by assignment of Oy Vaasa Parks Ab and the middle section by Varma.



**QMI**

QMI was developed as a completely new way to detect oil mist. The QMI oil mist detection system is designed to aid the carrying out of running repairs to an engine as necessary. This means that maintenance can be undertaken before a major failure has developed.

**Circle 101**



**MOPS**

Since 1935 MOPS Marine License Insurance has been providing license defense, income protection and civil liability defense and indemnity coverages to USCG licensed deck officers, engineering officers and certified tankermen. MOPS offers a wide range of license defense and income protection packages to state and federal pilots.

**Circle 102**



**JLMD**

The JLMD System is a pre-installed system allowing access to the highest and lowest point of each tank whatever the position of the angle of casualty. The JLMD system can be installed on any kind of cargo or bunker tank. It enables immediate access to the tanks of a sunken ship and quick recovery of its contents.

**Circle 103**



**SAM Electronics**

NACOS features integration for one man bridge operations; new generation of radar/pilot series and automatic speed control. To control the vessel's safe track considering navigation and collision avoidance is the main task of the officer on watch.

**Circle 104**



**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**



**FloaTEC**

FloaTEC, LLC is a joint venture company created by J. Ray McDermott and Keppel FELS to deliver deep-water floating production systems (FPS). The company boasts an unmatched portfolio of multiple FPS solutions for its clients. FloaTEC can deliver an unbiased solution that works best for the product.

**Circle 106**



**Panduit**

Panduit introduced a new cable tie installation tool. The pneumatic operation and ergonomic design of the PTH cable tie installation tool is designed to reduce operator fatigue and repetitive motion injuries. The PTH provides consistent installation of standard through heavy cross-section cable ties in less than one second.

**Circle 107**



**MAN B&W**

Man B&W Diesel has settled a GenSet re-powering contract with QGP. The company's submersible drilling vessel, Atlantic Star, will be undergo a refurb, which includes the replacement of the electrical power plants' original diesel generators. The new power source will be based on four MAN B&W Diesel type 7L27/38 Holeby Generating Sets.

**Circle 108**



**Dickinson**

Dickinson Marine manufactures diesel cookstoves, heaters and marine products which have been an important part of the commercial and pleasure boating industry since 1932. The barbecues are manufactured of stainless steel in an octagonal shape that provides strength and rigidity.

**Circle 109**



**LADD**

LADD Industries, an authorized U.S. distributor of Deutsch IPD environmentally sealed electrical connectors, is now offering the DTP10-4P, a new receptacle for printed circuit board (PCB) applications. The new receptacle offers a compact flange design which allows for mounting to the PCB through an enclosure or potting in place.

**Circle 110**



**NetWave**

NetWave Systems introduced its NW-4000 series of Compact Voyage Data Recorders. This VDR concept was developed in a co-maker ship between several manufacturers, making use of so Digital Signal Processors, within networked microprocessor architecture.

**Circle 111**



**Cranesmart**

Cranesmart Systems Inc. leads the industry with wireless crane safety equipment. We are a specialty manufacturer of Cranesmart load monitors, anti-2-block systems, LMI's (load moment indicators), wind speed indicators and boom angle indicator systems for all cranes and other winch line applications. Over 25,000 systems in use.

**Circle 112**



**Miller**

Miller Electric's new Dynasty 700 AC/DC TIG/Stick inverter features Independent AC amperage control and four AC waveshaping options. It can dramatically increase travel speeds while decreasing cycle times and the need for rework.

**Circle 113**



**Marine Safe Electronics**

Marine Safe Electronics of Canada Ltd. incorporated in 1972 and operating as MSE of Canada Ltd., manufactures and distributes insulation fault detectors for electrical motors, generators, transformers, power and control systems. Recently specified by Alstom and ABB for LNG owners/operators.

**Circle 114**



**Cat Pumps**

Cat Pumps introduces the new Mag-Jet Valve for jetting. The Mag-Jet uses a special SS magnetic valve and a super strong corrosion resistant magnet to hold one inlet valve open, creating a strong pulse-jetting action to power nozzles through the toughest clogs.

**Circle 115**



**Magnetrol**

Magnetrol International, an innovator in process control level and flow instrumentation, released the Echotel Model 961 Single-Point and 962 Dual-Point ultrasonic level switches. The Echotel Model 961/962 switches are engineered to keep process level measurement on a steady, uninterrupted course.

**Circle 116**



**Transas**

The Transas S-VDR 3100 is designed to meet and exceed the requirements of the IMO resolution MSC.163 (78) as well as A861 (20). It offers additional recording capabilities beyond IMO requirements such as ARPA and AIS. It features playback inside Navi-Sailor ECS. It features an ultra compact design.

**Circle 117**



**Lankhorst**

Lankhorst moldings offer thick-walled moulding technology for recycled plastics. It offers innovative solutions for products that can deal with impact, technical solutions that can withstand any tide, not only designed to perform, but also foreseen to be used again after a long service life.

**Circle 118**



**Weir**

With a range of engineered products, Weir Valves & Controls has developed an extensive global installed base and expertise across a wide range of industry sectors: including Power Generation, Oil & Gas, Refining, Petrochemical, Chemical, Pulp & Paper, and Desalination.

**Circle 119**



**Delta Wave**

Delta Wave Communications launched RigTrac system. It is a solution used for rig and asset tracking. The system beta tested in 2005 Hurricane season in the GoM and performed with zero errors. RigTrac offers a feature in that constant monitoring is not required until an asset moves from its designated location.



**LALIZAS**

LALIZAS produces mainly lifejackets, safety harnesses, inflatable boats, navigation lights, bilge pumps, canopies, ladders, paddles, boathooks, blocks & cleats, fenders, and clothing. LALIZAS products are distributed to more than 70 countries through an effective network of partners.

**Circle 121**



**Omnithruster**

For 25 years Omnithruster has been a world leader in the development of waterjet maneuvering systems. Its unique patented designs, which provide diverse maneuverability and auxiliary propulsion, have been the installation choice on vessels worldwide.

**Circle 122**



**ASA/Jensen**

ASA/Jensen Marine's Voyager Observation System can be utilized as a way to keep watch over the engine room or sleeping quarters. Using the system to for potential fire hazards is becoming a way to stay informed of the boat's inner workings. As another option, the observation system can also be used as a security system.

**Circle 123**



**Shell**

Shell Alexia LS is cylinder oil with a lower Base Number (BN), ensuring lubrication of modern low speed engines when burning Low Sulphur Fuel Oil. Its low BN means that the correct surface properties of cylinder liners are maintained and excessive piston deposits are avoided. Shell Alexia LS has good detergency and dispersancy

**Circle 124**



**Adveto**

Adveto Advanced Technology from Sweden celebrates its 20th Anniversary by launching three versions of its new type approved ECDIS-4000 full scale systems offering precision navigation together with ECDIS and ENC's

**Circle 125**

# BUYER'S DIRECTORY

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

## ACCOMMODATION LADDERS & GANGWAYS

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**

## ANCHORS & CHAINS

Anchor Marine, PO BOX 58645, Houston, TX 77258

## AUTOPILOT SYSTEMS

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

## BEARING- RUBBER, METALLIC, NON-METALLIC

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

## BOLLARDS

Anchor Marine & Industrial Supply, PO BOX 58645, Houston, TX 77258

## BULKHEAD SEALS/PANELS

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

## CAD/CAM SYSTEMS

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

## CAPSTANS

**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**

## 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**

## CFD SOFTWARE

CD-Adapco, 9401 General Dr., Ste 131, Plymouth, MI 48170

## COATINGS/ CORROSION CONTROL/PAINT

Ameron International Performance, 13010 Morris Road, Ste 400, Alpharetta, GA 30004

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

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

Sea Coat Technology, 11215 H Jones Road West, Houston, TX 77065

## COMMUNICATIONS

David Clark, PO Box 15054, Worcester, MA 01615  
L-3 Communications, 6000 Fruitville Road, Sarasota, FL 34232  
Pipeline Communications and Technology, Inc., 2800 Woodlawn Dr. Ste. 264, Honolulu, HI 96822  
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

Omega Engineering, One Omega Dr., Stamford, CT 06907

## CONTROL SYSTEM-MONITORING/STEERING

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**

Omega Engineering, One Omega Dr., Stamford, CT 06907

## COUPLINGS

**American Vulkan, 2525 Dundee Rd, Winter Haven, FL 33884, 863 324 2424, 863 324 4008, vulkanusa@vulkanusa.com, www.vulkanusa.com**

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

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

## CRANE - HOIST - DERRICK - WHIRLEYS

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

**DMW Marine, LLC, 1123 St. Matthews Road, Chester Springs, PA 19425, 610-827-2032, 610-827-1199, dw@dmwmarine.com, Contact: Douglas M. Weidner, www.dmwmarine.com/**

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

**Imes, Inc., 5139 Brook St., Suite E, Mont Claire, CA 917063**

## DECK MACHINERY- CARGO HANDLING EQUIPMENT

**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

**DMW Marine, LLC, 1123 St. Matthews Road, Chester Springs, PA 19425, 610-827-2032, 610-827-1199, dw@dmwmarine.com, Contact: Douglas M. Weidner, www.dmwmarine.com/**

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

Hyde Marine Inc, 28045 Ranney Parkway G, Cleveland, OH 44145-1144

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

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

**DIESEL ENGINE OVERHAUL**  
Fincantieri Marine Systems, 800 Principal Court, Suite C, Chesapeake, VA 23320

**DIESEL ENGINE- SPARE PARTS & REPAIR**  
Mariso USA, Inc., 12783 Capricorn Dr., Stafford, TX 77477

**DISPLAY TECHNOLOGY**  
Barco Simulation, 600 Bellbrook Avenue, Xenia, OH 45385

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

**DOORS- MARINE & INDUSTRIAL**  
Diamond/Sea Glaze, 19372-94th Ave, Surrey, BC V4N 4E4, Canada

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

Seaclear Industries, 220 Maltby Rd., Suite 131, Bothell, WA 98012

**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**

**EDUCATION**  
Massachusetts Maritime Academy, 101 Academy Drive, Buzzards Bay, MA 02532

**ELECTRICAL SERVICES**  
QCI Marine Offshore, 6754 Willowbrook Park Dr, Houston, TX 77066

**EMPLOYMENT**  
**Military Sealift Command, PO BOX 120, CODE APM-124, VIRGINIA BEACH, VA 23458-0120, 1-888-SEALIFT, webmaster@msc.navy.mil, Contact: Audra Lamb, www.msc.navy.mil/**

**ENGINES**  
Fairbanks Morse, 701 White Avenue, Beloit, WI 53111  
Fincantieri Marine Systems, 800 Principal Court, Suite C, Chesapeake, VA 23320

**ENVIRONMENTAL SOLUTIONS**  
Hyde Marine, 28045 Ranney Parkway G, Cleveland, OH 44145-1144

**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

**EXHIBITIONS/TRADE SHOWS**  
CMA Shipping, 62 Southfield Ave, Stamford, CT

**FENDERING SYSTEMS/ BUOYS - DOCK & VESSEL**  
Anchor Marine & Industrial Supply, PO BOX 58645, Houston, TX 77258

**FIRE & SAFETY PRODUCTS**  
Western Fire & Safety, 2446 NW Market Street, Seattle, WA 98107

**GALLEY EQUIPMENT**  
Jamestown Metal Marine Sales, Inc., 4710 Northwest 2nd Ave., Boca Raton, FL 33431

**GLASS**  
ProCurve Glass Technology, LLC, 3535 Davisville Rd., Hatboro, PA 19040

**HOISTS**  
**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**

**HVAC**  
Jamestown Metal Marine Sales, Inc, 4710 Northwest 2nd. Ave., Boca Raton, FL 33431

**IMAGING EQUIPMENT**  
EMX, Inc., 4200 Dow Road, Suite C, Melbourne, FL 32934

**INSULATION**  
Superior Energies, 3115 Main Ave., Groves, TX 77619  
Superior Energies Inc., 3115 Main Ave., Groves, TX 77619

**INTERIOR MATERIALS**  
**Thermax - Fipro, 3115 Range Rd., Temple, TX 76504, 8132642656, 8132642507, sales@thermaxmarine.com, Contact: John Hutchison, www.thermaxmarine.com**

## INTERIORS

Jamestown Metal Marine Sales, Inc., 4710 Northwest 2nd Ave., Boca Raton, FL 33431

**QCI Marine Offshore, 6754 Willowbrook Park Dr, Houston, TX 77066, 281 885 1300, 281 885 1349, Lbobbit@qcimarine.com, Contact: Larry Bobbit, www.qcimarine.com**

**JOINER, WALL SYSTEMS, CEILING SYSTEMS, DOORS**  
**Thermax - Fipro NA, 3115 Range Rd., Temple, TX 76504, 8132642656, 8132642507, sales@thermaxmarine.com, Contact: John Hutchison, www.thermaxmarine.com**

**JOINER- WATERTIGHT DOOR-PANELING- CEILING SYSTEM**  
Joiner Systems, 1925 52nd Avenue, Lacine, Quebec H8T 3C3, Canada

**JOYSTICKS & POTENTIOMETERS**  
Feteris Components USA, 4703 Murat Place, San Diego, CA 92117

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

**LIFEBOAT TESTING**  
Imes, Inc., 5139 Brook St., Suite E, Mont Claire, CA 917063

**LIFEBOATS/RAFTS**  
Viking Life Saving Equipment, 1400 NW159th Street Suite 101, Miami, FL 33169

**LIFESAVING EQUIPMENT**  
C.M. Hammar AB, August Barks Gatan 15, 421 32 Vastra Frolunda, Sweden

Viking Life Saving Equipment, 1400 NW159th Street Suite 101, Miami, FL 33169

**LOAD CELLS**  
**Omegadyne Inc, 149 Seltzer Ct, Sunbury, OH 43074, 740 965 9340, 740965 9438, info@omegadyne.com, Contact: Alfred Friere, www.omegadyne.com**

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

**MARINE ENGINEERING**  
Delta Marin, Kurokatu 1, Raisio FIN-2100, Finland

**MARINE EQUIPMENT**  
Tidewater Skanska, Inc., PO Box 57, Norfolk, VA 23501, 757-547-2153, 757-547-4806, sbj@tidewaterskanska.com

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

**MARINE HAZARD RESPONSE**  
Marine Respose Alliance LLC, 1102 SW Massachusetts St., Seattle, WA 98134-1030

**MARINE MANAGEMENT**  
Hornblower Marine, 115 East Market Street New Albany, IN 47150-3409

**MARINE PRESSURE TRANSDUCERS**  
**Omegadyne Inc, 149 Seltzer Ct, Sunbury, OH 43074, 740 965 9340, 740965 9438, info@omegadyne.com, Contact: Alfred Friere, www.omegadyne.com**

**MARINE TRANSPORTATION**  
SEACOR Marine, Inc., 5005 Railroad Ave., Morgan City, LA 70380

**MARITIME TRAINING & SCHOOLS**  
Marine Safety International, Marine Terminal, Laguardia Airport, NY 11371

**MONITORING SYSTEMS**  
Bulldog Technologies Inc., 11120 Horseshoe Way - Suite 301, Richmond, BC V7A 5H7, Canada

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

**NAVAL ARCHITECTS, MARINE ENGINEERS**  
BMT Fleet Technology, 311 Leggett Dr, Kanata, ON K2K 1ZB, Canada

**Bristol Harbor Group, Inc., 103 Poppasquash Rd., Bristol, RI 02809, 401-253-4318, 401-253-2329, design@bristolharbortgroup.com, Contact: Greg Beers, P.E. - President, www.bristolharbortgroup.com**

CDI Marine Co., 9550 Regency Square Blvd, Ste 400, Jacksonville, FL 32222

Delta Marin, Kurokatu 1, Raisio FIN-2100, Finland

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**

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EMX, Inc., 4200 Dow Road, Suite C, Melbourne, FL 32934

Security Services North West, Inc., P.O. Box 660, Port Townsend, WA 98368

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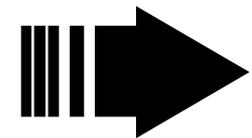
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Nabrico Marine Products, 1050 Trinity Road, Ashland City, TN 37016

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Bachelor's degree in a related field; high level of drive and imparting; strong interpersonal skills; persuasive, efficient and effective communicator; experience in development and leadership of multi-function teams; strong financial acumen, especially in program accounting; proven program management leadership in a multi-function environment; experience in managing international customers and teams; highly developed skills in written and oral communication skills; strong organizational skills; prior experience with US Navy and/or US Coast Guard will be viewed positively; some domestic/International travel required; US Citizenship or ability to obtain green card within 12 months.

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**Manager, Manager II, Marine Operations**

Job Location: Marshall Islands, Kwajalein US Army Reagan Test Site  
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Responsibilities: Oversees the management, operation and maintenance of the Marine Department for the logistic contract of U.S. Army vessels assigned to USAKA. In charge of all aspects of the Marine Department including budget planning and execution, personnel manning, safety program, training program, vessel operational tasks, maintenance program, and departmental administrative processes. Manages the departmental budget ensuring each PWS line item is budgeted and tracked through out the fiscal year. Submits budget plans and departmental cost estimates as required. Oversees the development the standard ferry schedules for Ebeye and Roi as well as the weekly watercraft schedule and the daily vessel and crew assignment. Manages the departmental safety program to include oversight of the work processes, JSAs, safety training and safety supervision of all work/tasks. Manages the departmental personnel actions including disciplinary issues and coordinates and reviews annual performance reviews and salary plan. He/she conducts vessel inspections and provides SeeSOR data and inspection results to appropriate authorities. Develops mission support plans with customers and ensures that crews are briefed on missions and duties. Oversees the departmental maintenance program through the Port Engineer including the budget planning and scheduling of vessel overhauls. He/she must be qualified as Pilot for the Port of Kwajalein and will direct and coordinate the movement and docking of visiting ships. He/she will, through the Port Captain, oversee the port operations including stevedoring, line handling and emergency response. He/she will, through the Port Captain, be in charge of the Oil Spill response team "CHARLIE". He/she will manage the dive team including ensuring qualified divers are available to operate the recompression chamber. Reports directly to the Deputy Program Manager for Logistics for orders, guidance, training and duties. Performs assigned systems tasks/efforts to include government directed work schemes under general direction

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  3. U.S. Coast Guard Unlimited Tonnage Master's license with all applicable STCW endorsements for international waters for

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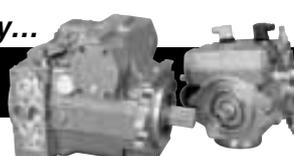
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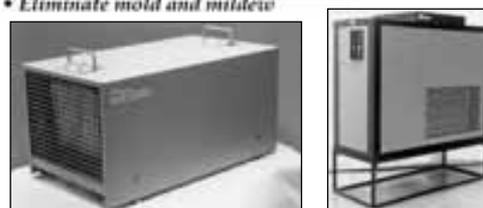
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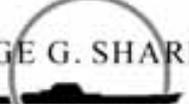
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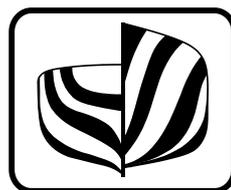
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