

HANDS-ON

The Newsletter of JMS Naval Architects & Salvage Engineers

2013 Volume 19

JMS Designs Fisheries Research Vessel for USGS



The 78' Fisheries Research Vessel FRV GRAYLING designed for the USGS Great Lakes Science Center

ENGINEERING & DESIGN

JMS Designs Fisheries Research Vessel for USGS Great Lakes Science Center

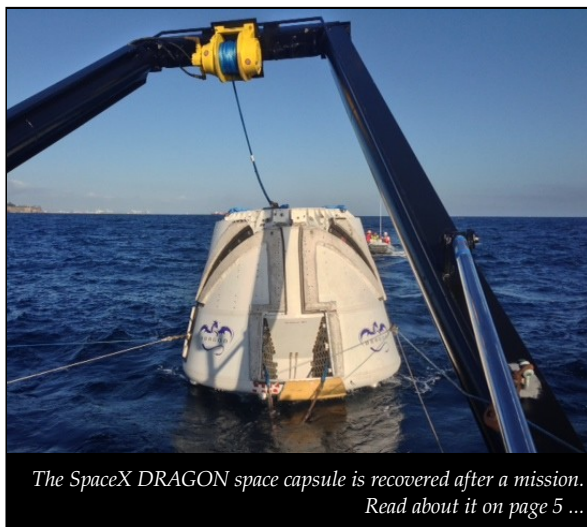
JMS has completed the contract design for a Fisheries Research Vessel for the U.S. Geological Survey's Great Lakes Science Center (glsc.usgs.gov). The FRV GRAYLING will replace the existing R/V GRAYLING and will become the newest member of a 5 vessel fleet owned and operated by the Great Lakes Science Center in Ann Arbor, Michigan. The Final Design, Construction, and Commissioning solicitation was issued for bids and a forthcoming award is expected in early 2013.

The 78-foot GRAYLING will be a state-of-the-art, steel monohull research vessel capable of oceanographic research and fisheries assessment on the Great Lakes. The vessel will be based at the Cheboygan Vessel Base. It is designed to conduct lake-wide bottom trawl surveys, acoustic surveys, gill net surveys, and a variety of over-the-side science operations. It will operate year-

round across three state boundaries, Canadian waters, and treaty waters in Lake Huron, Michigan, and Superior.

Propulsion will be provided by twin Caterpillar 454 BHP C12 C-Rating Tier II diesel engines and a bow thruster for increased maneuverability and station-keeping. The design includes a wet lab, dry lab, retractable transducers, ample

Engineering & Design is continued on page 2...



The SpaceX DRAGON space capsule is recovered after a mission.

Read about it on page 5 ...

Letter from the President



Dear Readers,

JMS has been involved in a wide variety of projects during the past 12 months providing naval architecture, marine engineering and marine surveying services to assist ship owners in the management of their fleet. Our staff has delivered innovative and cost-effective solutions to customers all over the country and has been aboard vessels as large as aircraft carriers and as small as amphibious DUKWs. We have even supported space craft launch and recovery missions. Several of our designs are currently under construction or recently completed including a 7,300 ton capacity floating dry dock, a refueling barge for mega yachts and a Fisheries Research Vessel for the U.S. Geological Survey's Great Lakes Science Center. Despite the diversity of our projects, we maintain a consistent philosophy of providing maritime engineering solutions using a unique combination of high-end analytical engineering expertise and practical deck plate experience.

Although we are proud of our past accomplishments, we realize that our continued success depends on a commitment to continuous improvement. Whether it is engineering, marine surveying, marine casualty response, or diving support we strive to back up our reputation with pragmatic results that bring real value to our customers every day. This year's newsletter describes many of these projects and I hope you enjoy reading about them. I welcome you to send me your comments at Blake@JMSnet.com or (860) 536-0009 ext. 14.

Best regards,


T. Blake Powell

ENGINEERING & DESIGN

working deck areas, large pilot house with excellent visibility, and comfortable accommodations and working areas for a 3-person crew and 6 scientists.

The FRV GRAYLING is the first vessel to be built from JMS' new Coastal Class Research Vessel - Fisheries Series. This new design was intended to remain flexible and support a wide range of coastal fisheries research science missions, outfitting, accommodations and geographic areas. It is also designed to be affordable.

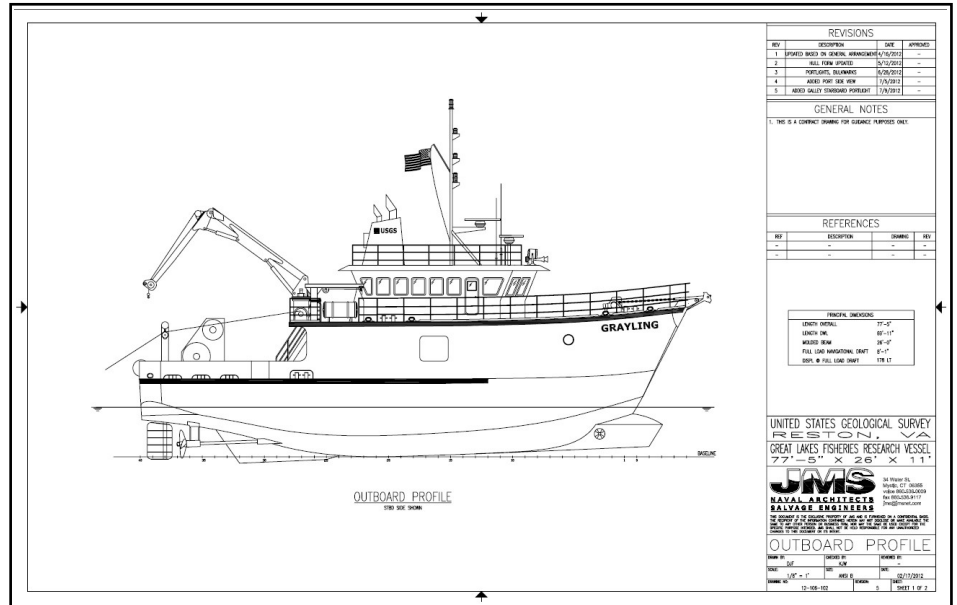
JMS has extensive experience specifically related to research vessel design and operation. In addition to providing entire designs of research vessels, JMS has provided engineering support for weight handling system design, structural modifications, mission mobilization, repowering, and systems integration to a variety of research vessels.

Customers include NOAA, National Science Foundation, Office of Naval Research, U.S. Coast Guard, the Department of Interior, Environmental Protection Agency, Woods Hole Oceanographic Institution, Harbor Branch Oceanographic Institute, University of São Paulo, and other major oceanographic institutions. In addition to providing naval architecture and marine engineering services, JMS conducts inspections and condition assessments for on-going fleet maintenance or long term fleet replacement planning. JMS naval architects understand the importance of defining the science mission requirements of a research vessel and balancing them with the operational, regulatory, and budget constraints.

JMS Designs Stevedoring Crane Barges for State of Rhode Island

JMS was competitively awarded a contract to design two crane barges for the State of Rhode Island. The crane barges will be used for stevedoring operations at ProvPort Inc., a nonprofit public-private partnership formed in 1994, which owns and operates the municipal port of the City of Providence, RI. ProvPort is New England's premier deep water multimodal facility for international trade and domestic distribution and one of the busiest ports in America's northeast.

JMS engineered and designed two deck barges that will be suitable to carry and operate a Liebherr LHM 550 mobile harbor crane. The 300-foot long x 72' wide rake/box deck barges have a deck rating of over 6,000 lb/sqft and are designed to support the rubber-tired mobile harbor cranes that will operate from the decks of



the barges. The design allows for the easy loading and unloading cargo ships to the dock or from ship to ship. The barges are ABS classed A1 Barges with notation "Deck Barge", uninspected and unmanned. JMS also prepared the technical specification documents to utilize in the solicitation of bids for the construction of the barges. The barges are expected to be placed in service in 2013.

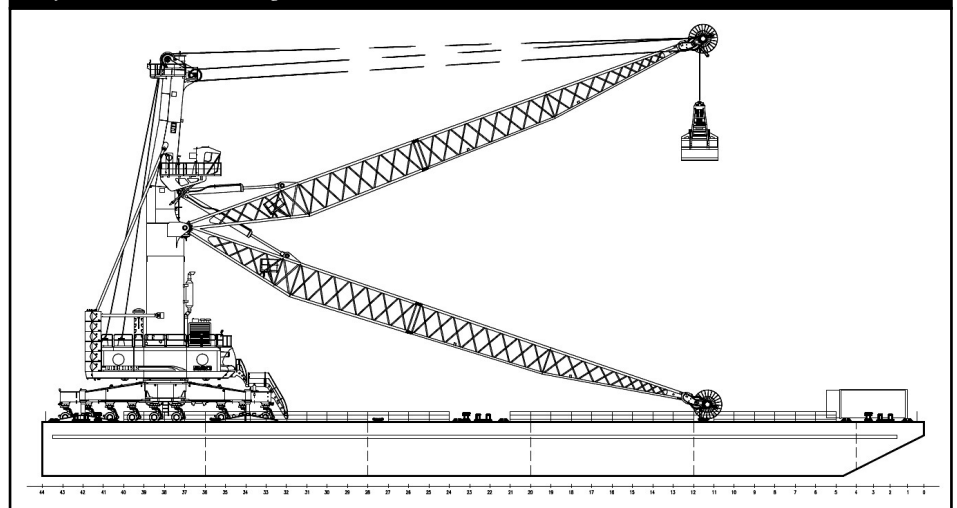
The contract was funded by the state's Transportation Investments Generating Economic Recovery (TIGER) II grant program award managed by the Rhode Island Economic Development Center (RIEDC). The grant was created by Congress in the 2010 Transportation Appropriations Act and will go towards the purchase and installation of the barges and two high performance harbor cranes. This new stevedoring equipment will



modernize and enhance the port's ability to continue its existing bulk material operations while expanding its capabilities to accommodate container operations; thus alleviating demand on the Port of Boston - the only existing container port in New England. The new crane barges will be critical for the port which has relied on 30-year-old rented crane barges that have been prone to breakdowns and have been out of service for prolonged periods.

The crane barges are estimated to remove on average 1,000 trucks per week off the northeast corridor highway system - one of the most congested in the country.

300 foot, 6,000 PSF crane barge





Design of Double-Hull Tank Barge

JMS was contracted by Senesco Marine of North Kingstown, RI to design a 50' x 18'-6" x 6'-8" tank barge with a 10,000 gal capacity for Ocean Havens. Ocean Havens owns a marina in Boston Harbor that caters primarily to mega yachts and will use the barge to fuel vessels in and around their facility.

HARBOR FUEL 1 is a double-hull tank barge with two pairs of port and starboard cargo tanks and voids fore and aft. JMS worked with Ocean Havens to design the pumping system to include two independent pumping and refueling stations. Fuel flow is monitored with a mechanical meter connected to a wireless system for billing and monitoring at the on shore offices. The barge is powered by an onboard generator or can be connected to shore

10,000 gallon double hull tank barge



power or a push boat. An office is provided in a climate controlled deckhouse.

JMS developed all drawings and specifications for review by the USCG Marine Safety center under Subchapter D requirements. The structural design meets all ABS oceans design requirements.



Floating Dry Dock Design and Support

This year has been an exciting year with the award for construction of a new dry dock for Caddell's Shipyard of Staten Island, NY. JMS designed the dry dock in 2010 for Caddell's Shipyard to have a lifting capacity of 7,300 LT,

with a 420' long, pontoon and 100' between the 30 foot tall wing walls. The dock is segregated into 8 pairs of compartments with a safety deck 12' above the pontoon deck. The design incorporates side access through the wing walls and has pumping and electrical system characteristics borrowed from existing dry docks at Caddell to simplify inventory and dock operations. The award for construction went to Senesco Marine in Quonset Point, RI where construction is well underway and erection of the pontoon blocks and wing walls has started. The dry dock is scheduled to be launched in mid April, 2013 via air bags. Senesco has commenced making the necessary modifications to its waterfront facilities in order to allow it to now have the capability of performing air bag launches for future projects.

JMS has also been engaged by Portland Yacht Services in Portland Maine, to perform an inspection and assessment of the Dry Dock OWL, which has added the dock in order to expand the services they provide mega yacht customers. The dock is 122' long, with 55.92' between wing walls, that are 21.33' high above the 7.5' pontoon depth. JMS made recommendations to PYS on how to operate the dry dock within its structural and stability limitations. JMS also provided guidance on how best to invest in the dock so it would better service their needs and the needs of their megayacht customers.



CADDELL DRY DOCK AND REPAIR CO., INC.



420 foot, 7,300 long ton dry dock under construction

NOAA Fisheries Research Vessel HENRY BIGELOW Winch Modifications

JMS was contracted by the National Oceanographic and Atmospheric Administration (NOAA) to design new winch foundations, winch control and power systems, and structural modifications to the NOAA Ship HENRY B. BIGELOW to improve the trawl net hauling capacity of the vessel. The HENRY B. BIGELOW is a 209 foot steel hulled ship built in 2005 and is used primarily to study and monitor



NOAA vessel BIGELOW winch modifications



Northeast Marine Fisheries throughout New England.

The crew and scientists aboard the BIGELOW haul catches of fish in their nets in excess of approximately 30,000 lbs. These extremely large catches present safety and operational issues for the crew of the BIGELOW as the vessel's weight handling systems were not capable of handling such large loads. At the request of NOAA, JMS conducted an assessment to survey the ship and analyze potential solutions to improve the net retrieval capacity of the vessel.

JMS developed the concept design for a new net retrieval system consisting of the two (2) modified Pullmaster 25,000 lbs line

pull winches to be mounted on the '02 deck and fitted with 7/8" Samson Amsteel line. The synthetic line is run forward and up through fairlead blocks on the '04 Deck, then aft and down to the trawl net. JMS provided concept drawings for the new winch foundations and the structural modifications to the '04 deck to

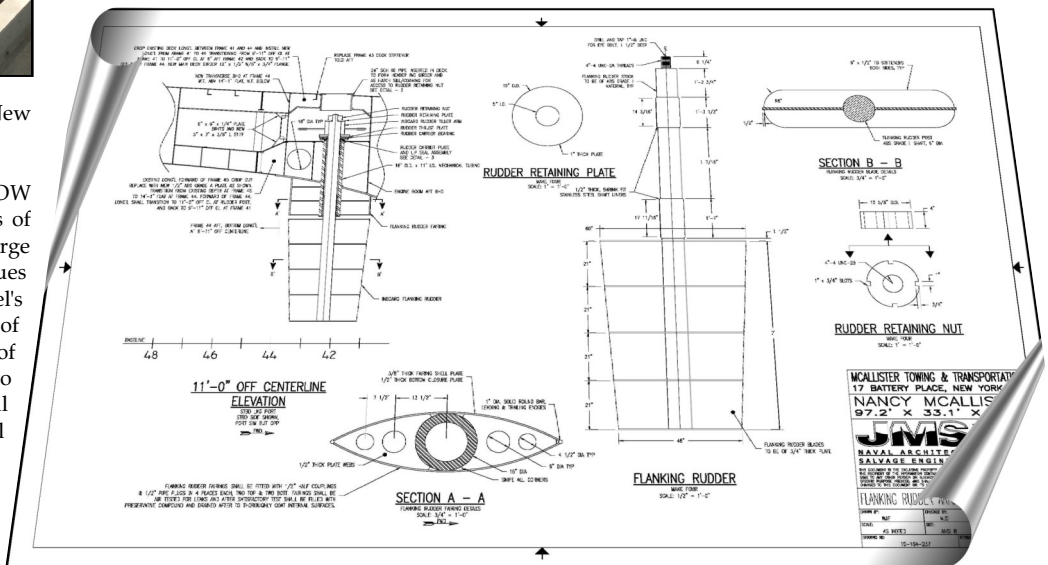
support the new blocks. JMS also provided drawings for the layout of the new hydraulic power unit that will supply these winches.

Tug Flanking Rudder Design

JMS has recently completed the detailed design and engineering for a new Flanking Rudder system, to be installed aboard the tug NANCY MCALLISTER, of McAllister Towing and transportation of NY. The vessel operates in Narragansett Bay, RI out of the Port of Providence and is a 4,000 hp twin screw tug with kort nozzles and barn door style rudders. This design retrofit was a challenging project because it was imperative to the vessel owner that the loaded draft not be unduly impacted by the installation of the flanking rudders and attendant machinery. The vessel configuration necessitates the flanking rudder steering gear to be either located below deck in way of existing ballast water tanks or above deck, potentially hampering towing operations and requiring a protective grating at bulwark height above. It was determined through careful design that the below deck steering compartment intrusion on



Tug flanking rudder system design and engineering



ballast water tankage would be minimized, with the result that the lost ballast water was made up in material weight of the installed steering gear, rudders, fairings and structural reinforcement. The design has been completed and currently shipyard bids are being reviewed for the completion of the modification to the NANCY McALLISTER.



SpaceX

On October 28th, the SpaceX DRAGON spacecraft capsule returned to Earth from the International Space Station and safely splashed down 250 miles off the coast of southern California. JMS provided engineering and design services for the modification of the A-frame on the American Marine Corporation vessel, AMERICAN ISLANDER in support of the spacecraft recovery.

Crane Barge Stability Analysis

Throughout 2012, JMS continued to support a number of clients in the marine construction industry by providing custom crane barge stability analysis services. JMS provided a full spectrum of crane barge services, ranging from general lifting capacity and stability calculations, to fully detailed crane load charts. In particular, JMS has helped many clients model crane and barge arrangements for specific job application, simulate the lifting configurations required to complete the job, and analyze potential ways to improve the stability of crane barges. JMS continues to provide crane barge stability reports and lifting beam analysis for National Crane Inspection in addition to crane barge stability analysis for: Aquarius Marine Company, Crofton Industries, and E.R. Snell Contractors Inc. Projects have included crawler cranes used for marine construction, fixed mounted dredge cranes and 55-ton mobile crane used for offloading bulk cargo.

New ERnet Vessels Get HECSALV and CMAX

This year JMS' Emergency Response Network (ERnet) welcomed aboard a number of newly built or acquired vessels. JMS developed HECSALV computer models of these vessels specifically for salvage engineering response by



American Marine Corporation's AMERICAN ISLANDER recovering SpaceX DRAGON space capsule

JMS engineers. JMS also developed companion CargoMax loading programs for many of the vessels. One of the most critical factors in assessing a marine casualty is determining the pre-casualty loading condition of the vessel. Because the CargoMax loading programs and the HECSALV salvage response computer programs are designed to work together, ERnet members realize the intrinsic value of paired programs designed to share accurate, pre- and

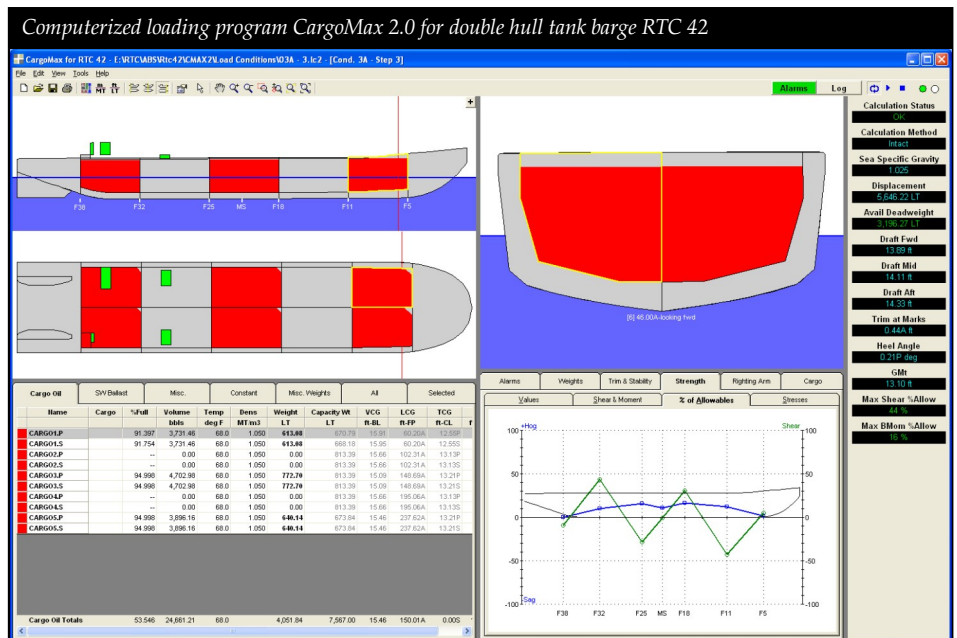
post-damage information during a marine casualty response. Some of the projects include:

Poling and Cutler Marine Transportation:

- 3,000 HP tug KIMBERLY POLING
- 30,000 BBL DH tank barge EDWIN POLING

Reinauer Transportation Companies (RTC):

- 4,000 HP Tug B FRANKLIN
- 2,900 HP Tug STEPHEN REINAUER
- 4,300 HP Tug LUCY REINAUER
- 3,600 HP Tug JOANNE REINAUER III
- 700 BBL DH tank barge RTC 10
- 42,500 BBL DH tank barge RTC 42
- 60,000 BBL DH tank barge RTC 62
- 100,000 BBL DH tank barge RTC 104



Stability Analysis and Inclining Tests

In accordance new United States Coast Guard Passenger Weight and Inspected Vessel Stability Requirements, all passenger vessels must be in compliance with the new Assumed Average Weight per Passenger (AAWPP) of 185lb. The new AAWPP has been instituted due to prior vessel incidents such as the capsizing of the tour boats ETHAN ALLEN and DUKW MISS MAJESTIC. JMS was involved in the investigation and forensic engineering of both incidents and identified overloading as the primary cause to the instability of the vessels. Also, it became evident that previous passenger



Amphibious passenger vessel stability test

weight standards of 140lb, 160lb, or 165lb per person are not representative of the average person today. For passenger vessel operators this means assessing their vessel's stability with the new AAWPP and adjusting the passenger

capacity if necessary. JMS has supported numerous vessel operators to ensure their compliance with the new AAWPP and get approval from the Coast Guard. JMS has extensive experience in passenger vessel stability and operations and understands the importance of maximizing passenger capacity.

This year JMS completed inclining tests and stability analyses for two amphibious passenger vessels: WATERFRONT WANDA, a DUKW owned and operated by Boston Duck Tours; and SOUTH SIDE SALLY, a DUKW owned and operated by Just Ducky Tours in Pittsburgh, PA.



Sailing vessel stability analysis

JMS took detailed measurements of the DUKW hulls and chassis to create HECSALV computer models for stability analysis and USCG submittal. JMS completed a simplified stability test for the PATRICK TRACY JACKSON, a canal tour boat in Lowell National Historical Park to determine its new passenger capacity in accordance with the 185 lb AAWPP. JMS also completed an intact and damage stability analysis for submittal to the USCG for the ROBERT C. SEAMANS, a 40-meter brigantine sailing school ship owned and operated by the SEA Education Association in Woods Hole, MA.

Other Engineering Projects

JMS Naval Architects & Salvage Engineers has unique expertise in naval architecture, marine engineering, shipboard operations, salvage engineering, towing, and shipyard construction. JMS maintains a full time staff of naval architects and engineers with sea-going and vessel operations experience. This combination of high-end analytical engineering expertise and practical seafaring experience allows JMS to deliver rapid and innovative solutions to complex problems, only a few of which are described in this year's newsletter.

Customer	Project
Just Ducky Tours	• Amphibious Passenger Vessel Stability Assessment
Mill Wright LLC	• Engineering Support for Heavy Lift Transport
McAllister Towing	• Tug Flanking Rudder Engineering and Design
Connecticut Dredge	• Dredge Barge Engineering
Atlantic & Pacific Marine	• Deck Barge Damage Survey
Boston Duck	• Amphibious Passenger Vessel Stability Analysis
Reinauer Transportation	• Tug Repowering Assessment
National Crane Inspection	• Crane Barge Stability Assessment
Reinauer Transportation	• Tug Shaft/Strut Design and Engineering
US Geological Survey	• Research Vessel Construction Quality Assurance
US Geological Survey	• Research Vessel Lifting Gear Structural Analysis
Aquarius Marine	• Crane Barge Stability Assessment
Poling & Cutler Marine Transportation	• Tug Safety Audit
Lowell National Historical Park	• Passenger Vessel Stability Assessment
Maritime Attorney	• Sport Fishing Vessel Casualty Expert Witness
American Marine Corp	• A-Frame Structural Analysis and Design
Galveston Sea Scouts	• Passenger Vessel Survey
Poling & Cutler	• Tug Kimberly Poling Hecksalv
Poling & Cutler	• Tug Crystal Cutler Hecksalv
Sea Education Association	• Sail Training Vessel Stability Assessment
BB Metals	• Aircraft Carrier Towing And Shipbreaking Plan
Great Lakes Shipyard	• US Coast Guard Blocking Calculations
OSG	• Tank Barge Computerized Stability Programs
Maritime Attorney	• Tug Casualty Expert Witness
Portland Yacht Services	• Dry Dock Strength and Stability Assessment
Gwenmore Marine	• Tug Fire Detection Systems
Donjon Marine	• US Navy Salvage Manuals
BBT Ship Breakers	• Ship Breaking Engineering Assessment and Procedure Review
Electric Boat	• Heavy Lift Barge Fendering System Design
Reinauer Transportation	• Tug System Drawings and Design
Crofton Diving	• Crane Barge Stability Assessment and Load Chart
Maritime Attorney	• Crane Barge Expert Witness
Hartford Insurance	• Pier Damage Assessment

MARINE SURVEY & INSPECTION

This past year our staff has conducted marine surveys all over the country aboard vessels as large as aircraft carriers and as small as amphibious DUKW's. Customers have included the National Science Foundation, NOAA, the Office of Naval Research, insurance companies, tug owners, and charter fishing vessel owners. JMS conducts marine surveys and vessel inspections to provide valuable information for vessel owners enabling them to manage their fleet safely and efficiently. JMS personnel are certified by the American Waterways Operators (AWO) as Responsible Carrier Program (RCP) auditors and the Society of Marine Surveyors (SAMS). Surveys conducted by JMS this past year include:

- Condition surveys of ships, barges, and dry docks for preacquisition purposes
- Structural assessments of aging vessels for steel renewal and overhaul planning
- Research vessel safety and material condition assessments
- Vessel safety inspections
- Sea trials
- Tow surveys and planning
- Safety management system audits
- Accident investigation surveys

National Science Foundation Ship Inspection Program

JMS has a long history of supporting the National Science Foundation in the management of the academic research vessel fleet and ensuring the ships and scientific systems are both fully operational and state-of-the-art. This experience has given JMS a unique insight and understanding of the specific needs of the marine science community. With broad expertise in naval architecture, JMS can relate theoretical designs on paper to the practical implications of how the ship can best serve the science mission effectively and safely.

JMS has conducted over 150 research vessel inspections for the National Science Foundation since 1997 ensuring the vessels are maintained in a high degree of operational readiness and able to meet current and emerging oceanographic research objectives. The multidisciplinary team of engineers understands the importance of identifying the science mission requirements of the vessel and balancing them with the operational, regulatory, and budget constraints. The survey ensures that the fleet serves the science community effectively and safely and that the



JMS conducted a survey of the aircraft carrier EX-SARATOGA (CV-60) to develop a preliminary towing and dismantling plan.



ships are keep up with emerging technologies and requirements related to oceanographic research.

The missions supported by these vessels are multidisciplinary oceanographic research and range from water-quality monitoring in the Great Lakes to deep-ocean drilling for geophysical research. The fleet includes vessels longer than 230 feet that are able to work worldwide, intermediate size regional vessels which carry about 20 scientists for up to a month, and smaller local vessels under 130 feet. The JMS inspection team surveys each vessel on a biennial basis. Each research vessel is surveyed pier-side and underway during a two-day inspection. JMS provides NSF with current, documented reports that assist in the evaluation of vessel condition and in developing funding objectives for maintaining the vessels and the scientific equipment in a high degree of operational readiness to meet oceanographic research objectives. JMS also provides engineering

services in support of NSF's management of the fleet. One of several tasks included providing technical review of new Rope and Cable Safe Working Load Standards. These standards establish operating principals, structural design, maximum permissible loadings, tests, and documentation of science research overboard handling systems.



NOAA Fleet Ship Structure & Machinery Evaluations

NOAA awarded contracts to JMS in 2012 to conduct a Ship Structure & Machinery Evaluation Survey of the research vessels THOMAS JEFFERSON and OKEANOS EXPLORER. The 208 foot THOMAS JEFFERSON surveys the oceans and harbors along the Gulf of Mexico and East Coast of the United States to maintain and update nautical

This past year, JMS conducted research vessel inspections aboard:

Vessel	Length	Location	Operating Institution	Owner
RV ATLANTIC EXPLORER	168'	Bermuda	Bermuda Inst. of Ocean Sc.	Bermuda Inst. of Ocean Sc.
RV MARCUS LANGSETH	235'	San Diego, CA	Lamont-Doherty Earth Obs.	National Science Found.
RV BLUE HERON	86'	Duluth, MN	University of Minnesota	University of Minnesota
RV ATLANTIS	274'	Port Everglades, FL	Woods Hole Ocean. Inst.	Office of Naval Research
RV ROGER REVELLE	274'	San Diego, CA	Scripts Inst. of Oceanogr.	Office of Naval Research
RV POINT SUR	135'	Moss Landing, CA	Moss Landing Marine Lab.	National Science Found.
RV HUGH R SHARP	146'	Lewes, DE	University of Delaware	University of Delaware
RV ENDEAVOR	185'	Narragansett, RI	University of Rhode Island	National Science Found.

Ship Structure and Machinery Evaluations for NOAA Fleet



charts. Home ported in Rhode Island and known as “America’s ship for ocean exploration”, the NOAA Ship OKEANOS EXPLORER is dedicated solely to exploration. The 224 foot ship conducts operations around the globe, mapping the seafloor and characterizing largely unknown areas of the ocean.

The objective of the evaluations was to identify the present condition of each vessel and determine potential remaining service life with respect to hull structure; main and deck

machinery; electrical systems; auxiliary systems; and vessel navigation/communications systems. JMS engineers spent three days aboard the vessels and reviewed maintenance history and documentation to determine the vessels’ current and projected conditions. The estimated service life of inspected spaces and machinery was documented in a report provided to NOAA. This was used to determine a rough order of magnitude estimated cost for each vessel to have a service life of at least of 10 years.

DIVING SUPPORT

Divers Institute of Technology

Divers Institute of Technology (DIT), located in Seattle, WA, is a subsidiary of JMS and provides a fully accredited program of commercial dive training. There are typically between 130 and 160 students on campus at any one time and about 200 students will graduate in 2012.



DIT Develops Guidelines for Diving Operations near Delta P Hazards

The Canadian Association of Diving Contractors (CADC) recently published definitive guidance for divers working in differential pressure (Delta P) environments. Statistics from several occupational health and safety sources indicate that a high number of commercial diving accidents are linked to a lack

JMS Marine Surveys and Vessel Inspections in 2012





Commercial diver training at Divers Institute of Technology

of proper understanding of the hazards posed by differential pressures in various underwater work environments. DIT staff and members of a Canadian Standards Association (CSA) subgroup worked closely with CADC to develop the *Guidelines for Diving Operations on Dams and Other Work Sites Where Delta-P Hazards May Exist*. The guidelines provide a basic understanding of the forces and hazards associated with Delta P and detail procedures and identifies equipment to prevent diver exposure to hazardous Delta P forces. The guidelines also offer some limited rescue options for a diver trapped in a Delta P situation. DIT is incorporating the guidelines into its commercial diver training curriculum. The CADC Guidelines may be downloaded here: www.cadc.ca/downloads/DeltaPHazards_CAD_C.pdf

Last year DIT relocated from Ballard, WA to a newly renovated Lake Union waterfront facility in Fremont that provides high-tech classrooms, increased office and student spaces, an enhanced student resource learning center, expanded welding facilities, and state-of-the-art



diving tanks that are used for welding and burning classes. The diving barge platforms were completely renovated with additional manifolds and upgraded dive stations.

The DIT 28-week Commercial Diver Course meets all ANSI and CSA requirements for qualification as an Unrestricted Surface Supplied Air Diver. Graduates receive their certifications from the Diver Certification Board of Canada (DCBC). The DCBC has reciprocity agreements with the HSE, ADAS, and IMCA, and is both recognized and accepted globally,



allowing DIT graduates to seek employment from anywhere in the world.

As the core course continued to be revised and enhanced during 2012, DIT also began developing advanced course modules, including advanced NDT, Diving Medical Technician, advanced welding, Hyperbaric Technician, and unexploded ordnance (UXO).

DIT's 165-foot deep diving training vessel RESPONSE is fully-equipped to support air, mixed gas, and oxygen diving operations as well as surface decompression dives. DIT is the only U.S. commercial diver training school offering genuine at-sea diving operations.

DIT has also formed an exclusive alliance with The Underwater Centre at Fort William, Scotland to provide advanced SAT and ROV training at the Fort William facility for all North American divers who have the required experience and training.



DIT has always maintained a refresher course program available to all DIT graduates. As the core curriculum continues to be enhanced and additional advanced training modules are offered, DIT envisions that their core curriculum along with the opportunity for advanced training will lead to a life-long center for continued education.



Diving Operations at Bath Iron Works

20 years has passed since JMS began providing on site supervision and project management support for all diving operations at Bath Iron Works (BIW). This has been an accident free operation that has continued to improve over the last two decades. This past year, the dive team supported the construction of one new Arleigh Burke destroyer, USS MICHAEL MURPHY DDG-112 and the new DDG-1000 Zumwalt class destroyer. Several hull inspections were performed on USS MICHAEL MURPHY following launch and sea trials.

Diving operations also focused on the inspection and upkeep of the 18 grids that make up the 3 landing areas for the 750 foot long floating dry dock. Each grid is 100 feet long by 8.25 feet wide and roughly 12 below the surface. The grids are concrete structures set on top of concrete pylons driven into bedrock. On the top of these grids are mats which act as dunnage to protect the dry dock when it sets down. There are 3 Land Level building ways which connect to the dry dock by rails and allow for the hydraulic transfer of a fully assembled ship into the dry dock. Each of the 3 Land Level ways under the floating dry dock is supported by 6 grids which absorb the weight and provide a stable surface for the transfer of a completed ship. Once the ship is deemed ready for launch, the dry-dock pumps up off the grids and transits out into the Kennebec river by use of winch driven chains and sinks into the launch basin. The completed ship is then floated out and brought pier-side for continued production and/or upkeep.

The dive team plays an important role in maintaining the NAVSEA certification of BIW'S Land Level Transfer Facility and floating dry dock by conducting underwater inspections and performing maintenance. This past year the team replaced six 2.5 ton dunnage mats that were either damaged or missing off the top of the different grids. Each of the 18 grids have 10 dunnage mats on top of them and are held in place by stainless steel angle brackets that are turn buckled to pipes on the concrete grids. The hard wood dunnage mats are 10 feet long and held together by stainless steel rods. These mats

do not float in the water, weigh about 2.5 tons, and must be lifted into place using a crane. This year saw the employment of a spud barge with crane to salvage identified dunnage mats and to replace or re-orient several mats on the different grids. This project was conducted safely and in an efficient manner and provided the dive team with some interesting work.

One of the core missions of the BIW dive team is to maintain and inspect the BIW infrastructure. This includes pier/piling maintenance, sacrificial/cathodic anode inspection and fire pump inlet cleaning. JMS maintains an underwater camera and DVD recording capability to document quality assurance of the dive tasking and provide evidence of needed repairs and as-found conditions. Since the shipyard is situated on the Kennebec River in Maine, extreme seasonal climatic variations coupled with very large tidal fluctuations and heavy silting require continued underwater maintenance actions.

Other News...

MARAD Design Competition Award

JMS Naval Architect and recent University of Michigan graduate, David Forrest was part of the design team that was awarded First Place in the US Maritime Administration (MARAD) and Society of Naval Architects & Marine Engineers

(SNAME) Student Design Competition at the 2012 SNAME Annual Meeting. The 2012 MARAD/SNAME Design Competition required teams to submit a design for a Short Sea Shipping Vessel for service on the East Coast. The shipping route was between Jacksonville, FL and Bridgeport, CT and required the transportation of 300 tractor trailers per day.

David's design team designed the vessel as part of their Capstone Design Project at the University of Michigan in 2011. To meet the design requirements, the team proposed using a fleet of three high speed trimarans carrying 150 tractor trailer units each. To remain competitive with the driving time between each city, the vessel was designed to have a cruise speed of 36 knots making the 900 nm trip in approximately 30 hrs. Power was provided by three 40 MW gas turbines connected to three waterjets. The tractor trailers were stored on two vehicle decks accessed through ramps on the stern and the bow. The arrangements allowed the trucks to load and unload without backing up, decreasing the time required to be in port. Accommodations were provided for all of the truck drivers who would ride the vessel to their destination.



L to R: SNAME President, Ed Comstock; MARAD Program Manager, Pradeep Nayyar; and JMS Naval Architect, David Forrest



MARAD is the recognized, experienced advocate and catalyst within the government for public/private sector commercial partnerships in the maritime arena. Research partnerships are formed with government agencies, industry, and others to evaluate and demonstrate the effectiveness of advanced performance technologies and processes to operate in a safe, secure, and environmentally responsible manner. The purpose of the MARAD/SNAME Student Design Competition is both to challenge college student teams and to reward them for their development of superior vessel designs or transportation systems.

Search for BONHOMME RICHARD

JMS' support of the non-profit Ocean Technology Foundation's quest for the Revolutionary War ship BONHOMME RICHARD (BHR) continued this year with its most complex and collaborative mission yet with generous corporate sponsorship from Resolve Marine Group. The French Navy provided substantial support to the North Sea search. A hydrographic ship equipped with side scan sonar and a magnetometer scanned the seabed for the first week of the mission. During the next two weeks, a sonar-towing ship worked in tandem with a dive support ship and divers to more closely investigate targets found during the first week. A U.S. Navy team operated an Autonomous Underwater Vehicle from the dive ship, providing opportunities for training French Navy divers in its application, and using it to further classify targets.

This was the fourth collaborative BHR mission between the US and French Navies in as many years. This international quest is a symbol of the two nations' intertwined maritime histories, with the French having loaned the BHR to the young Continental Navy. The team added another 37 square nautical miles of seabed to the area covered in previous missions. Project Manager Melissa Ryan blogged the expedition (<http://searchforbhr.blogspot.com>) in order to share events at sea as they were happening. After dives on many irregularly shaped rocks and sand formations, and during the last hour of the mission, one interesting target was discovered and is worthy of further investigation on a future mission. It was too deep for divers to reach, so a Remotely Operated Vehicle will hopefully conduct the next phase of the investigation.

On September 23, 1779 one of the fiercest battles of the Revolutionary War took place off the coast of Flamborough Head, England between BONHOMME RICHARD and HMS SERAPIS.

French Navy survey vessel LAPLACE



BONHOMME RICHARD was captured by John Paul Jones who is often considered the father of the United States Navy. The battle between the two ships took place at point-blank range and lasted almost three and a half hours. John Paul Jones emerged from the battle victorious and captured SERAPIS as his prize.

potentially significant cultural resources and surface geologic features in the project area where the BONHOMME RICHARD is believed to have sunk. OTF and JMS have conducted expeditions every year since 2006 to investigate potential sites. Major assets have included the

It is a common misconception that the BONHOMME

RICHARD sank at the site of the battle with HMS SERAPIS. In fact, the ship drifted for 36 hours afterward, with Jones' crew trying to save her -- which makes the search particularly challenging. Over the past seven years, OTF and JMS have conducted extensive archival research, created a Geographic Information System map containing charts, wreck lists, and geological data, and designed the first computer hydrodynamic drift model created to find this ancient shipwreck. The end product was a comprehensive GIS map and database of



Battle of Flamborough Head by artist Dean Mosher

US Navy's NR-1, USNS GRASP, French Navy mine hunters and research vessels, private research vessels, and numerous ROV's and AUV's.

U.S. Navy Sonar technician searching for the wreck of the BONHOMME RICHARD



The search for the BHR is a quest that belongs to everyone -- the interested citizen, the history buff, the donors who support the Ocean Technology Foundation, the men and women who serve or have served in the Navies, and young students whose interest in marine technology is piqued by learning about the BHR missions. The expeditions have been an outstanding demonstration of the power of Naval partnerships, interoperability, technology transfer, and maximization of resources toward a common goal.

Twelve New "Calculators" Added to JMS iPhone/iPad Application

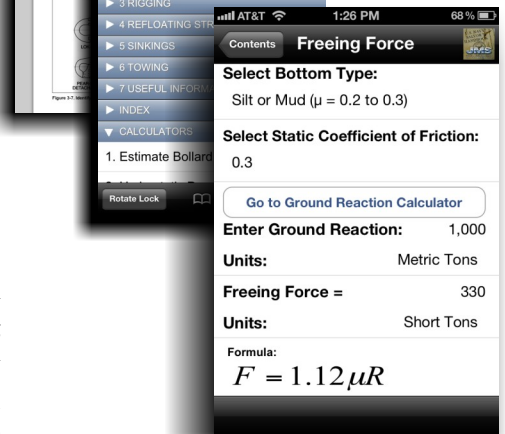
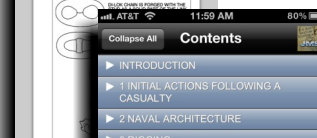
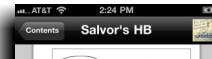
JMS is proud to announce version 3.0 of our popular iPhone/iPad application based on the U.S. Navy Salvor's Handbook. Past customers receive the update for free. This is a universal app that is optimized for both the iPhone5 and iPad3. The latest version incorporates 12 easy-to-use calculators based on the most popular formulas in the US Navy Salvor's Handbook:

- Estimate Bollard Pull
- Hydrostatic Pressure
- Flooding Rate
- Moment to Trim One Inch
- Shaft Diameter
- Tons per Inch Immersion (TPI)
- GM from Roll Period
- Freeing Force
- Ground Reaction
- Patch Thickness
- Change in Draft
- Current Force

The U.S. Navy Supervisor of Salvage wanted to provide to their on-scene salvage personnel, access to their extensive library of marine casualty response know-how; the "hard-earned and sometimes blood-stained" knowledge and lessons-learned from decades of U.S. Navy



U.S. Navy Salvor's Handbook Ver. 3.0



response to all types of commercial and military ships in distress around the world, during peacetime and war, and salvage operations of all sizes and scopes. The Salvor's Handbook was intended to be a condensed and ready-reference of expert guidance that could fit in the salvor's hip pocket.

JMS first authored the U.S. Navy Salvor's Handbook for the Supervisor of Salvage in 1990, and since its government publication, JMS has received thousands of requests for the handbook from commercial mariners and salvors all over the world.

Commercial and military marine salvors are not the only ones who find this ready-reference indispensable. Owners and operators of both commercial and recreational vessels of almost any size and purpose will find this practical compendium of marine casualty response know-how very handy - if not invaluable - before, during and after a ship casualty. Naval architects, marine engineers and other maritime professions rely on it as a handy diagnostic, repair, design, and engineering reference; while at the office, and on the water.

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