

Marine Machinery Association -

Great Green Fleet Brings Environmental Responsibility in Economically Sustainable Ways through Continuous Communication, Cooperation, and Collaboration

On December 16, 1907, the USS Connecticut (BB-18), flagship of the Great White Fleet, set sail from Hampton Roads, Virginia, in the splendor of naval superiority. The objectives were circumnavigation and diplomacy. The goals were the overt display of a global US naval presence and the promotion of international peace. Twenty-eight white hulls and flagged bows made their way to Port of Spain, Trinidad, and on to the rest of the world and history. President Teddy Roosevelt welcomed the fleet's successful return on February 22, 1909. One hundred years later, the United States has retained and reinforced its position as the preeminent naval power, pioneering naval superiority far beyond the dreams of those who welcomed in the White Fleet's return. This position has been enjoyed by our nation largely because of the strategic efforts of industry and organizations like the Marine Machinery Association (MMA) and others. The shipbuilders and manufacturers rose together to meet the challenges of the 20th century. They still stand together in the face of the obstacles and opportunities of the 21st Century such as the Great Recession, rising environmental concerns, and a shift in public policy.



Jack Janetatos, Chairman of the Board, Marine Machinery Association

MMA was formed in 1984 as a collaborative organization of hull, mechanical, and electrical equipment manufacturers who supply the goods, components, equipment, and services used on board Navy ships. Since its inception, MMA has expanded to include all manufacturers of systems, products, and services related to ships and shipbuilding. The association now boasts 46 member companies from a variety of marine industries. MMA membership provides excellent networking opportunities for organizations through conferences, regular industry updates and news, and other valuable benefits. Currently the focus of MMA is to provide a forum for member companies to communicate, cooperate, and collaborate with other industry members and entities across the entire field of marine machinery and to provide

the best "equipment and protection to bring the war-fighter safely home."¹

On May 3, 2010, Secretary of Defense Gates spoke at the Navy League Sea-Air-Space Exposition in National Harbor, Maryland². The semi-annual Marine Machinery Association conference on May 11, 2010, largely echoed the industry response to Secretary Gates' address. The MMA met without their board chairman, Jack Janetatos, who was absent (recovering from hip surgery) for the first time since he assumed the position twenty years ago. Though he was missed, MMA showed its commitment to working together to respond to the collective challenges borne from the remarks of the Secretary of Defense. In his address, Secretary Gates praised the war

The ultimate goal is to provide the best equipment and protection to bring the war-fighter safely home.

¹ Detter, Brian R., Deputy Assistant Secretary of the Navy, Expeditionary Warfare. National Harbor, MD: May 11, 2010.

² Gates, Robert M., Secretary of Defense. Retrieved from <http://www.defense.gov/Speeches/Speeches.aspx?SpeechID=1460>.

efforts of the last decade—primarily the wars in Iraq and Afghanistan—and he discussed the need to decrease the cost of shipbuilding while concurrently ramping up the “greening” efforts of the Navy. A plan to launch the “Great Green Fleet” in 2016 has been enacted and will likely drive shipbuilding processes and projects far into the coming decade and beyond. The challenge for MMA members and all industry players will be to make their products more environmentally sustainable while keeping costs as low as practical. As the Great White Fleet was an image of peace through strength, the Great Green Fleet will be a model of strength through sustainability.

After John Lovasz of Rolls Royce gave introductory remarks, Jack Barney of Johnson Controls’ York Navy Systems welcomed the MMA members to the spring conference. Jack quoted former President Eisenhower saying, “Spend as much as necessary on national defense – and not one penny more,” reflecting the attitude of the Pentagon today as it looks to make the purchase and acquisition processes more efficient and cost-effective. Jack spoke of Secretary of the Navy Mabus’ five principles of acquisition reform:

- Clearly identify requirements
- Raise the bar on contract performance
- Rebuild the acquisition workforce
- Support the industrial base
- Make every dollar count



Jack Barney, Vice-Chairman, Marine Machinery Association

***“Spend as much as necessary on national defense – and not one penny more.”
-Dwight D. Eisenhower***

These principles of reform are possibly daunting but achievable through the communication and cooperation of the MMA members. The MMA conference had many speakers and themes, but recurring throughout were the principles of communication, cooperation, and ultimately collaboration as the primary and most beneficial response to the commissions given by Secretaries Gates and Mabus to make better quality products with sustainable practices and at lower cost. The technologies needed were a topic of the conference’s keynote speaker, Mr. George Drakeley, Group Director for Marine Machinery Systems, Naval Sea Systems Command (NAVSEA).

Concurring with the Secretaries of Defense and the Navy, George Drakeley of NAVSEA advocated using the market forces to determine which alternative energy firms are commercially viable, cost effective, and environmentally compliant. The ultimate result should be a cost reduction for ship ownership. Mr. Drakeley outlined steps toward energy efficiency, technological innovation, distance support, and commonality, defining the Navy as the first adopter in innovative testing and certification processes. The Green Naval Strike Group is currently planned for a local demonstration in 2012, with a worldwide deployment set for 2016. In addition to the Great Green Fleet, the Department of the Navy (DON) has set the following goals to further the “greening” of the Navy:

- By 2015, reduce petroleum usage in the commercial fleet by 50 percent
- By 2020, 50 percent of shore-based energy requirements will be met with alternative sources
- By 2020, 50 percent of all DON energy consumption will come from alternative sources.

Mr. Drakeley also outlined a number of new efficiency technologies, including alternative fuels, solid-state lighting, hybrid-electric drives, CVN78 Class ship improvements, electrical safety and commonality and distance support through the Integrated Condition Assessment System (ICAS) program. In pursuing commonality, Mr. Drakeley stressed the cost reduction benefits, drivers for ILS support costs, and the reduction of total ship ownership costs. Innovative platforms like the hybrid drives on LHD-6 and LHD-8, the ICAS systems on LPD-17 and the DDGs show the Navy's commitment to updating its fleet in response to 21st century demands. ICAS is especially useful, providing just-in-time maintenance and constant monitoring of key shipboard components, giving remote diagnostic reports to the ship to drive needed maintenance, much like the OnStar system used by General Motors in its vehicles. The goal of ICAS is to lower ship maintenance costs over the lifetime of the vessel allowing the ship to perform the "right maintenance at the right time for the right cost."³



**Mr. George Drakeley, MMA Conference
Keynote Speaker**

*...the right maintenance at the
right time for the right cost.
– George Drakeley*

The DON has mandated that equipment using alternative fuels must be drop-in replacements—that is, they must be invisible to the operator, must meet fuel performance requirements, require no change to aircraft or ship infrastructure, and have the ability to be mixed or alternated with petroleum fuel. This could pose a significant challenge to MMA members and other machinery manufacturers. To meet this challenge, Mr. Drakeley reiterated the theme of communication and cooperation between companies.

He outlined the need for NAVSEA and MMA to work together to propel sustainability into the future, increasing the value added to both the MMA member companies and the Navy.



**Mr. Brian Detter, Deputy
Assistant Secretary of the Navy**

Primarily addressing the relationship between the Navy and MMA was Mr. Brian Detter, Deputy Assistant Secretary of the Navy – Expeditionary Warfare (DASN ExW). Mr. Detter spoke of the priorities of the Secretary of Defense, ASN/RDA and of DASN ExW. Mr. Detter's major summary point called for MMA, its member companies, and the industry at-large to innovate their systems. Energy efficiency, unmanned systems, and other 21st century challenges; including "greening" the Navy and acquisition reform are coming so companies must make every dollar count. In response to making the money count, one comment from the audience echoed a valid concern that the process of decision-making for new construction ships' equipment is not the most effective choice for the life of the ship, in that it raises the total cost of ship ownership for the life of the ship.

Following Mr. Detter, a panel of presenters representing Original Equipment Manufacturers (OEM) presented their thoughts on the overarching theme of the MMA conference: "HM&E Equipment for the

³ Drakeley, George, Group Director for Marine Machinery Systems, Naval Sea Systems Command. National Harbor, MD: May 11, 2010.

313 Ship Fleet.” Moderator John Rhatigan of the Entwistle Company spoke briefly of innovations and developments at the Entwistle Company in addressing technical and inventory issues with respect to their 15-Hp motor. This included discussions of the replacement components and how it will be incorporated into ships’ systems. Jack Barney presented some very interesting statistics including the massive reduction in fleet from 1953 (1,122 ships) to 2007 (279 ships). Jack discussed ways to economically expand the Navy to reach its 313-ship goal without incurring cost increases. Jack addressed the need for scalability and expansion of products across platforms, technical specification standardization, through-life cost analysis, and reduced technical and testing requirements. Jack stressed the importance of good testing—that is, the right tests, the right data, and the right use of that data—not extra, arbitrary or wasteful testing. One significant example of standardization is the reduction of future amphibious platforms to a single ship type, allowing for economies of scale and scope to direct the cost of production. Standardization through cooperation and communication would serve as keys for MMA members to grab the short- and long-term shipbuilding opportunities.

***“Long Government approval processes of technical documentation ...ultimately increases the cost of shipbuilding.”
- David Douglas***

In the panel discussion, Bob Kirst of GLOBAL/SFC Corporation focused on the rising material costs for those products supplied by GLOBAL/SFC and the need to standardize and create economies of scale. Bob advocated a strategic partnership of MMA member companies both to increase material savings and to spread best practices thereby extending the knowledge base. Dale Carrick of Hunt Engineering built upon the other panelists as he discussed the need to maintain the aging fleet, not just prepare for new construction. Dale spoke of port support and supply chain management, where one may integrate vertically and horizontally through partnership and analyzing cycles and trends of cost and production. The premier benefit of a well-managed supply chain is the decrease of inventory costs, allowing for a tighter balance between stock and just-in-time production.

The final panelist, David Douglas (Howell Laboratories) spoke briefly of Howell Labs’ products, like the ICAS—which monitors equipment condition remotely—and Diminishing Manufacturing Sources Material Shortages (DMSMS), designed to identify and report obsolete components aboard ships. Mr.



From left to right - Mr. Jack Barney, Mr. Bob Kirst, Mr. Dale Carrick, and Mr. David Douglas

Douglas voiced struggles with shipyard material processing, where hang-ups prevent processing urgent material requests, and problems with approval processes for technical documentation. He stressed the need for shorter turnaround times with technical documentation, consistency in communications, and standardized specifications and requirements across government entities and with commercial industry partners. The inconsistency in approval processes increases the cost to the manufacturer, and ultimately increases the cost of shipbuilding as well. The innovation and collaboration required to remain viable in the coming years resonated with each panelist and

those themes were echoed when Dr. John Pazik, Director, Ship Systems and Engineering Division, Office of Naval Research (ONR), gave his presentation on current research initiatives at ONR.

Science and Technology gained the most notice in Dr. Pazik's presentation. Upcoming innovation and ongoing research highlighted the director's points. Degaussing systems using high temperature superconductor (HTS) materials make degaussing more reliable, generate negligible heat, and are significantly lighter than conventional degaussing systems. Ships with HTS degaussing systems are lighter and more magnetically invisible. Satisfactory tests in performance, reliability, and endurance of HTS degaussing systems have been conducted on the USS Higgins (DDG-76), and the system will be used on other platforms. HTS technology is also being pioneered for use in power dense propulsion, electric generators, and hi-capacity power cables. Compared to a conventional motor, an HTS motor is inherently quieter, costs less, smaller (less than half of the normal size) and lighter (one-third of the standard weight). An HTS motor also has a higher net efficiency.



Dr. John C. Pazik

Dr. Pazik reiterated the energy targets of the Secretary of the Navy and discussed these advances and others as methods to achieve the Secretary's proposed goals. One proposal from ONR is the operation of the entire ship's electrical system on a single electric generator. Single generator operations have been shown to significantly lower specific fuel consumption. Simultaneously, ONR is exploring the use of the hybrid electric drive for propulsion in low power operations. Onboard power storage and node switching devices are being considered as methods to further "electrify" the fleet, lower fuel consumption and overall environmental impact. Another objective of ONR is to find smart ways to increase automation and reliability to lower manning requirements on each ship. ONR has sponsored the Electric Ship Research and Development Consortium—a group of "universities with industry partnerships established in 2002 to address fundamental science and technology issues in power distribution and control."⁴

During the conference lunch, MMA took on a lighter and nobler task: a small but very meaningful award ceremony to present the Jack Flannigan Award. The recipient for the 2010 Jack Flannigan Award, Dr. William H. Luebke, currently serves as the Technical Director for the Naval Surface Warfare Center - Corona Division. Dr. Luebke retired from the Navy in 2004 as a Captain; He is an alumnus of the US Naval Academy and holds a Master of Science in Mechanical Engineering as well as a PhD in Ocean Engineering from Massachusetts Institute of Technology. Dr. Luebke has worked and served in numerous military, public, and private positions always advancing the cause of global naval superiority in war and peace.



John Lovasz and Jack Barney present Dr. Bill Luebke (right) with the Jack Flannigan Award.

⁴ Pazik, John C., Director, Ship System and Engineering Design Division, Office of Naval Research. National Harbor, MD: May 11, 2010.

The Jack Flannigan award is a bronze statuette of a perched eagle with spread wings. Its presentation to Dr. Luebke presented a new challenge for him—getting the sharp, metallic object through airport security—the true measure of the ingenuity needed to, in fact, receive such an award. This task was neither lost on Dr. Luebke, nor did it seem daunting to him.



The Jack Flannigan Award

Dr. Luebke's address following the award presentation was marked with his wit and obvious leadership ability. He was humbled to receive the award as one whose contributions have all along been a thing of his own passion with no need for recognition. Yet he received the award with grace and expressed appreciation to the MMA leadership, Chairman Jack Janetatos, Vice-Chairman Jack Barney, and MMA President John Lovasz. Bill also fondly related his first interview with NAVSEA 05: where he was given a fresh box of dry-erase markers, a white board, and water. Smiling, he recalls that the interview lasted four hours. His experience with shipboard systems, technology, and innovation is pervasive, and his advice was timely. To the MMA conference's recurring themes of Communication and

Cooperation, Dr. Luebke, suggested that addition of Collaboration, where companies and groups do more than discuss innovation, they truly pioneer together, helping each other and working together for their mutual benefit.

"Embrace, don't fear testing...good testing costs less than bad testing" – Jim Kidd

The after-lunch presenters connected many of the themes of Communication, Cooperation, and Collaboration in specific ways to their respective companies' products, beginning with Ms. Kimberly Richards-Mace of Bath Iron Works (BIW) who spoke of operational challenges with multiple ship platforms. Cost is the paramount concern, and collaborative supply-

chaining and scaling is one of the answers to meet these challenges. BIW asks MMA colleagues to understand too, that supplier incumbents should not assume contracts will be easily awarded. Rather BIW sees every contract as a competitive process to drive costs down to more manageable levels. However, Ms. Richards-Mace clearly expressed that suppliers are critical to the success of BIW and that BIW, the MMA members, and the entire industry must work together to support the Navy's needs.

"Over the last decade, the defense budget has increased by 45 percent. The DOD must consider the effects of budget cuts on 2nd - and 3rd -tier supplier companies."
- Brett Lambert

Shifting to more specific electrical safety and test requirement—one of Defense Secretary Gates' priorities in electrifying and greening the fleet—Kurt Hartsough, NAVSEA 05P13, spoke of changes to shock test requirements, analysis, and extension as well as discussions of Shock Grades A and B. Mr. Hartsough iterated that shock testing should be done on a principle unit, not on its subsidiary components. Following Mr. Hartsough, Jim Kidd, Naval Surface Warfare Center, Carderock Division – Ship Systems Engineering Station, outlined new realities and challenges in electromagnetic compatibility for HM&E machinery. Radio Frequency (RF) emissions below decks have spiked recently with the increased usage of handheld electronic devices and wireless networks, as well as increased inboard reliance on automated systems. Technologies such as advanced

degaussing, hybrid electric drive propulsion, EMALS, AAG, and PAWDS have all raised existing RF levels within the ship. Challenges with specifications in testing and compatibility taught a number of lessons; primarily that less rigorous limits, scope, testing, process, and documentation make the commercial standards unsuitable for military use. Jim reminded the conference that good testing costs less than bad testing overall. He touted that MMA members should embrace, not fear, testing⁵. Organizations must work together, transferring best practices, to facilitate cost-effective, environmentally sustainable shipbuilding.

Continuing Mr. Kidd's thoughts on best practices, sharing, and interaction, Mr. Brett Lambert spoke on the relationship between the Department of Defense (DOD) and the shipbuilding community. Mr. Lambert began by outlining the "Seven Pillars of Industrial Policy" set forward by the DOD:

1. Not starting over
2. Resetting our relationship with industry
3. More sophisticated approach to policy
4. Retain needed workforce skills
5. Operating in a global environment
6. Focus on industry to support the war fighter
7. Rule with reason

In light of the fact that defense budgets have expanded more than 45 percent in the last decade, leading to massive expansion of smaller, highly-specialized product suppliers, Brett cased the need to evaluate eminent budget cuts against their effects on 2nd- and 3rd-tier businesses. He warned shipbuilders that the industry must prepare for tighter times and should remain largely transparent to increase the communication, cooperation, and collaboration needed to survive in a do-more-for-less environment. In light of this news, Mr. Lambert did give some encouraging information, saying that the coming export controls reform will be pleasing to the shipbuilding industry.



**RADM Craig E. Bone,
USCG (Retired)**

The final presenter, RADM Craig Bone, USCG (Ret.), Vice President Government Operation, American Bureau of Shipping, showed some startling detail in recent material evaluations that have led to major equipment or structural repairs, representing massive avoidable costs to the Navy. Citing examples like the USS John F. Kennedy (CV-67) and USS Chosin (CG-65), RADM Bone noted that "deferred maintenance and inspection has contributed to premature decommissioning of valuable assets and fleet readiness degradation."⁶ By deferring hull coatings inspection and maintenance for up to four years, the Navy incurred cost factor increases that were nine times more costly than normal. This type of short-term cost-cutting by deferring maintenance is not the cost savings that will be demanded of the shipbuilders in future contracts. Cost-controlling

"In 2016, the MMA will be able stand alongside the Navy in welcoming home its own display of superiority: a fleet of warships that can fight and win wars, and "leave no trace"—that is, or will be, the Great Green Fleet"

⁵ Kidd, James, A., LME, Naval Surface Warfare Center, Carderock Division – Ship System Engineering Station. National Harbor, MD: May 11, 2010.

⁶ Bone, Craig E., RADM, USCG (Ret), Vice President Government Operations, American Bureau of Shipping. National Harbors, MD: May 11, 2010.

measures should, and will, be evaluated on a through service life basis. RADM Bone advocated proven commercial processes and measurement tools that will enable a ship to last her full service life. The Achieving Service Life Program (ASLP) uses a systems thinking approach to evaluate the eventual cost of maintenance deferral. ASLP evaluates HM&E components for integrity, using engineering software to locate potential problem areas early and determine repair needs. Though the ASLP is not perfect and needs some adjustment ship-to-ship, it has already been implemented on a number of ships including the USS Germantown (LSD-42), which is currently considered the model user of the ASLP.

Communication, Cooperation, and Collaboration took preeminent places as themes at the May MMA conference. The original conference title and focus was HM&E Equipment for the 313-Ship Fleet, but as each presenter addressed the conference, it became clear that these “three C’s” were the real theme of the meeting and currently the most important goal for the MMA and its members. One additional resonating theme throughout all the presenters was the challenges faced in presenting to the Navy its Great Green Fleet by 2016, at or under budget. Yet in spite of the pressure to perform well and quickly, MMA reminds its members that “to do more for less” is not “doing less”. Certification, testing, quality control, and equipment maintenance must be performed correctly and on time. Fuel efficient ships with leaking ballast tanks are neither environmentally friendly nor less costly. Each supplier, shipbuilder, MMA member, and government entity must consider the safety of the public and the safety of the sailor when looking for cost savings. “Greening” the fleet cannot be done without careful planning and implementation to control cost with a long-term, life cycle perspective. Sharing best practices within the shipbuilding community, working collaboratively to improve all MMA members’ profit margin, and building the strategic partnership available through Marine Machinery Association will be the best—if not the only—options for shipbuilders and manufacturers of the 21st century. In 2016, MMA will be able stand alongside the Navy in welcoming home its own display of superiority: a fleet of warships that can fight and win wars, and “leave no trace”—that is, or will be, the Great Green Fleet.



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For more information about the Marine Machinery Association, including membership details, visit: www.marmach.org

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