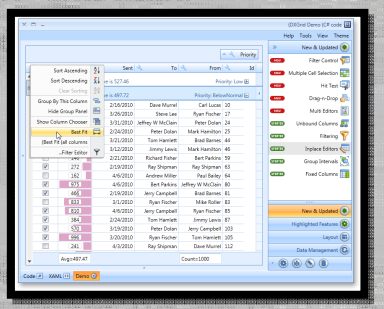

TEAM
SHIPS
REDUCING ENERGY
COSTS
RDML David H. Lewis
RDML James P. McManamon
13 October 2010

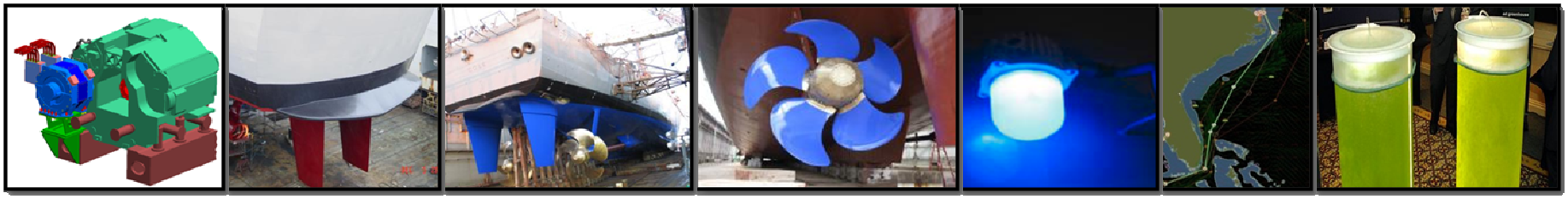
ENERGY IN SHIP ACQUIS

- The Past
  - Stern Flap
  - Solid State Lighting
- Gaining Knowledge
  - AC units fighting space heaters
  - Integrated Condition Assessment System (ICAS)



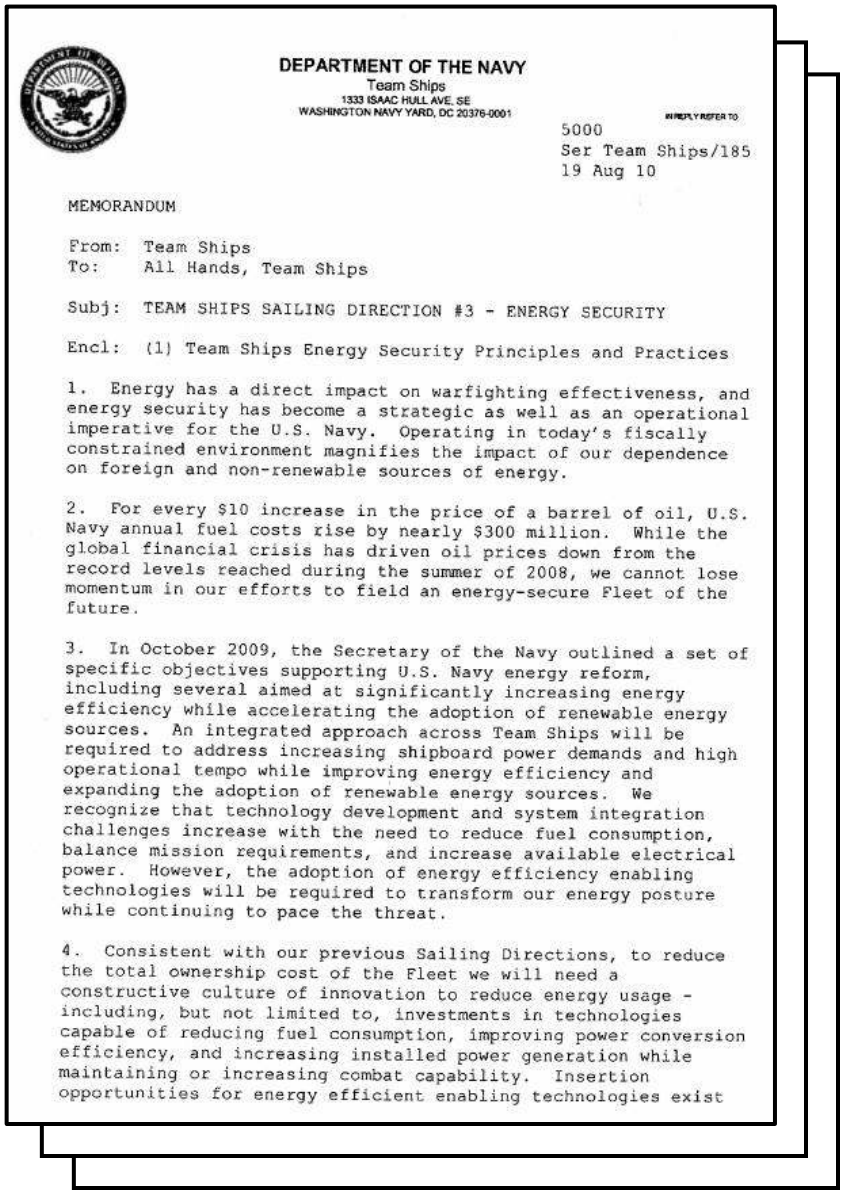
Energy Efficiency Enabling Technologies

2012	2016	Future
Hybrid Electric Drive	Hull Hydrodynamic Mods	New Engines and Generators
Alternate Fuels	Generator Mods	Fuel Cells
Solid State Lighting	Heat Energy Recovery	Wind Energy Harvesting
Foul Release Coatings	High Efficiency Chillers	Solar Energy Harvesting
Online GT Water Wash	Energy Dashboard	Air Film Hull Drag Reduction
GTG Efficiency Improvements	Propulsion Mods	
Combustion Trim Loop	Degaussing Mods	
Smart Voyage Planning Decision Aid	Modular Refrigeration Units	
Stern Flaps	Advanced RO Desalinator	
Variable Speed Drives	Electric Meters	
Low Solar Absorption Coatings	Energy Storage Module	



Energy Security Sailing Direction

- Leverage investments in Energy Efficiency Enabling Technologies
  - Reduce Fuel Consumption
  - Improve Power Conversion Efficiency
  - Increase Installed Power Generation
  - Increase/Maintain Combat Capability
- Implement TOC based approaches to ensure affordability
  - Modeling
  - Methodical Technology Development



DEPARTMENT OF THE NAVY
Team Ships
1333 ISAAC HULL AVE, SE
WASHINGTON NAVY YARD, DC 20376-0001

5000
Ser Team Ships/185
19 Aug 10

MEMORANDUM

From: Team Ships
To: All Hands, Team Ships

Subj: TEAM SHIPS SAILING DIRECTION #3 - ENERGY SECURITY

Encl: (1) Team Ships Energy Security Principles and Practices

1. Energy has a direct impact on warfighting effectiveness, and energy security has become a strategic as well as an operational imperative for the U.S. Navy. Operating in today's fiscally constrained environment magnifies the impact of our dependence on foreign and non-renewable sources of energy.

2. For every $10 increase in the price of a barrel of oil, U.S. Navy annual fuel costs rise by nearly $300 million. While the global financial crisis has driven oil prices down from the record levels reached during the summer of 2008, we cannot lose momentum in our efforts to field an energy-secure Fleet of the future.

3. In October 2009, the Secretary of the Navy outlined a set of specific objectives supporting U.S. Navy energy reform, including several aimed at significantly increasing energy efficiency while accelerating the adoption of renewable energy sources. An integrated approach across Team Ships will be required to address increasing shipboard power demands and high operational tempo while improving energy efficiency and expanding the adoption of renewable energy sources. We recognize that technology development and system integration challenges increase with the need to reduce fuel consumption, balance mission requirements, and increase available electrical power. However, the adoption of energy efficiency enabling technologies will be required to transform our energy posture while continuing to pace the threat.

4. Consistent with our previous Sailing Directions, to reduce the total ownership cost of the Fleet we will need a constructive culture of innovation to reduce energy usage - including, but not limited to, investments in technologies capable of reducing fuel consumption, improving power conversion efficiency, and increasing installed power generation while maintaining or increasing combat capability. Insertion opportunities for energy efficient enabling technologies exist

Energy Surveys

Baseline shipboard energy consumption and identify major energy consumers on ships.

Sponsorship:

- PEO Ships for 1 survey (New Construction)
- CPF-NAVSEA 21 for 2 surveys (In-Service)

Survey Phases:

- Pre-Survey Research and Data Collection
- At sea Data Collection (during multiple operational scenarios)
- Data Analysis

Ships:

- DDG 111
- DDG 51 Class
- LSD 41/49 Class

Energy Technologies Currently in the Fleet

Combustion Trim Loop

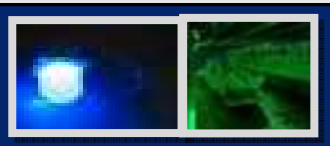
USS PELELIU (LHA 5)

GT Online Water Wash

USS PREBLE (DDG 88)

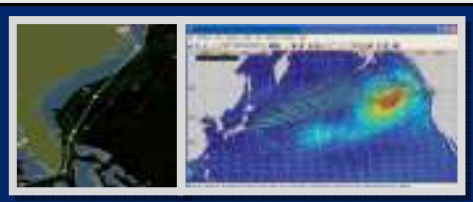
Auxiliary Propulsion System

USS MAKIN ISLAND (LHD 8)



Solid State Lighting

USS WASP (LHD 1)
USS IWO JIMA (LHD 7)
USS PEARL HARBOR (LSD 52)
USS CHAFFEE (DDG 90)
USS WAYNE E MEYER (DDG 108)



Smart Voyage Planning Decision Aid

USN CARL BRASHEAR (T-AKE 7)
Naval Maritime Forecast Center

Hull & Propeller Coatings

USS PORT ROYAL (CG 73)
USS COLE (DDG 67)
USS GUNSTON HALL (LSD 44)

Stern Flaps

FFG 7 Class
DDG 51 Class
CG 47 Class
LPD 17 Class
LHD, LSD Classes
PC 1 Class

Alternate Fuels

RHIB

Variable Speed Drive Motors

Various

Upcoming Energy Technologies in the Fleet

Hybrid Electric Drive

USS TRUXTUN (DDG 103)

Alternate Fuels

RCB-X | LCAC | YP | SDTS | GSG

Stern Flaps for In-Service L Ships

USS WHIBDEY ISLAND (LSD 41)

USS KEARSARGE (LHD 3)

Collaboration

Military Sealift Command

- Smart Voyage Planning Decision Aid
- Model Development
- Energy Surveys
- Maritime Working Group Member

International

- Royal Australian Navy
- International Frigate Working Group

Oceanographer of the Navy

- Smart Voyage Planning Decision Aid
- Physical Environment Authority MOU

Coast Guard

- Maritime Working Group Member

COMPACFLT

- Energy Surveys
- ICAS
- Maritime Working Group Member

Maersk

- Consulting on Commercial Shipping Best Practices

Office of Naval Research

- Maritime Working Group Member

Department of Energy

- MOA
- Leveraging Technology Investments