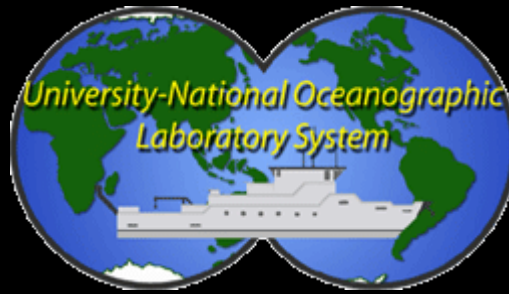


Greening the U.S. Academic Fleet: Progress Report

March 12, 2014

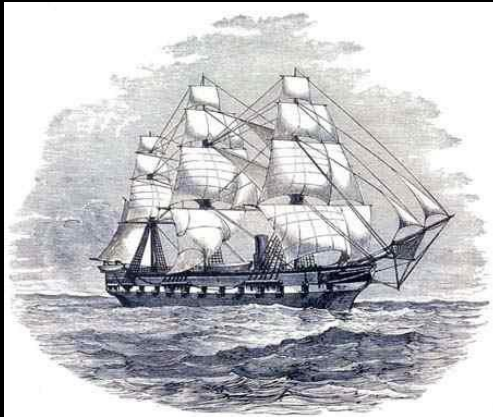
Bruce H. Corliss
Graduate School of Oceanography
University of Rhode Island



Greening the Research Fleet

January 10-11, 2012

Nicholas School of the Environment



?????



Regional Class Environmental Assessment

NSF,OSU,Glosten

REGIONAL CLASS RESEARCH VESSEL DESIGN

Green Ship Alternatives

PREPARED FOR:

Oregon State University
Corvallis, Oregon



THE GLOSTEN ASSOCIATES

1201 Western Avenue, Suite 200, Seattle, WA 98101-2921
TEL 206.624.7850 FAX 206.682.9117 www.glosten.com

BY:

Robert T. Madsen, PE
PROJECT MARINE ENGINEER

CHECKED:

Elizabeth E. White, PE
PROJECT MANAGER

APPROVED:

David W. Larsen, PE
PRINCIPAL-IN-CHARGE

DOC: 12100-054-01 REV: P1 FILE: 12100.02

DATE: 1 November 2013



Propulsion		
Variable speed generators	Incorporated	Estimated 5-15% reduction in fuel consumption
Battery hybrid	Not recommended	Minimal benefit with variable speed generators. Adds cost & weight.
Alternative fuels, LNG	Not recommended	Integration of LNG system incompatible with vessel design
Alternative fuels, Biodiesel	Not recommended	Biodiesel up to B20 may be possible, minimal design impact more significant fuel planning impact
Permanent magnet alternators and motors	Recommended	Increased motor efficiency
Wake adapted propellers	Recommended	Increased propeller efficiency, decreased underwater radiated noise

Auxiliary Systems		
Waste heat recovery	Incorporated	Provides heat for HVAC, water makers, and domestic hot water. ~350 kW electrical savings
Climate Control – air/air heat exchangers	Consider further during PDR	Likely impractical due to space constraints, may offer benefit if feasible
Climate Control – Waste heat heating	Incorporated	Can replace electric heat for large heaters, 70+ kW electrical savings
Climate Control – Heat pump	Not recommended	Less efficient than waste heat heating, equivalent to chiller A/C
VFD pumps and fans	Consider further during PDR	Electrical savings, possible noise attenuation concern
Premium efficiency motors	Recommend (where appropriate)	3-10% electrical savings
LED Lighting	Consider further during PDR	Lower energy use, higher upfront cost

Table 1 **Green Ship alternatives**

Green Ship Alternative	Recommendation	Benefit/Rationale
Hull		
Hull optimization	Incorporated	15% reduction in resistance
Hull coating	Recommend hard coating with frequent in water cleaning	No biocide toxin release
Green Ship Alternative		
Recommendation		
Benefit/Rationale		
Solar system	Not recommended	Minimal benefit with available installation area
Novec 1230 fire suppression	Incorporated	Minimum application of greenhouse gas
Non-ozone depleting refrigerants	Incorporated	Minimize environmental damage
Outfitting		
3" minimum insulation	Incorporated	Reduce heat loss/gain
Sustainably sourced, environmental friendly materials	Recommended	Minimize environmental impact

Pollution Control		
Biologic MSD	Incorporated	Clean effluent
5 PPM OWS	Incorporated	Minimize oil discharge
Fuel overflow system	Incorporated	Minimize risk of accidental fuel oil discharge
Environmentally acceptable lubricants	Recommended	Minimize impact of accidental oil discharge
Minimize underwater radiated noise	Incorporated	Minimize noise pollution
Ballast water treatment system	Incorporated	Required, reduces spread of invasive species
EPA Tier 4 engines	Incorporated	Reduce engine air emissions
Solid waste storage	Incorporated	No incinerator air emissions



April 8–9, 2014

**URI GRADUATE SCHOOL
OF OCEANOGRAPHY**
Narragansett Bay Campus
South Ferry Road
Narragansett, RI

Participants will include:
marine architects, designers,
builders, and operators of
research and commercial vessels.

BY INVITATION

Please register before
March 30, 2014.

Registration Fee: \$100
Access Code: green ocean

Register now!

GREEN BOATS AND PORTS FOR BLUE WATERS

A Workshop to Promote Environmental Sustainability of Boats and Ports

Attend this 2-day national workshop to facilitate communication between academia, governmental agencies, and private industry involved in the environmental sustainability of ships, boats, and ports. Participants will exchange information and develop sustainability recommendations for the operation of existing and future ships and construction of future ports and other marine facilities.

Featured Presentations:

- Use of Biofuels and Biolubricants
- Hybrid Tug Design and Operation
- Environmental Classification for Vessels
- Environmental Assessment of New Research Vessels
- Environmental Sustainability in the Cruise Industry
- Green Marinas in Rhode Island
- Port Development and Sea Level Rise
- Ship Energy Audits

Workshop includes:

- Promoting environmental sustainability with marine vessels and ports.
- Development of guidelines for construction, operation, and recycling of vessels and future port development. [Learn more.](#)

Sponsorships generously provided by 11th Hour Racing, Utilidata, Braemar Energy, and UNOLS.

If you have a disability and need an accommodation, please call 401.874.2024 at least three business days in advance. For TTY assistance, please call the R.I. Relay Service at 711.