ONR's TechSolutions creating green ideas that light up ships and submarines

February 24 2011

Solid State Lighting LED fixtures may one day replace existing hazardous fluorescent lights aboard submarines and surface ships. Credit: US Navy photo

One Sailor's request to replace humming fluorescent bulbs with a quiet alternative inspired the Office of Naval Research (ONR) to create the Solid State Lighting (SSL) project, currently being evaluated aboard several ships and submarines across the U.S. Navy.

A product of ONR's TechSolutions program, SSL is one of several rapid-response technologies created using recommendations and suggestions from Navy and Marine Corps personnel. (Watch TechSolutions products in action via YouTube.)

The SSL project introduced the energy-saving, nonhazardous LED

fixtures on USS New Hampshire (SSN 778) in late January. In July, installation is also scheduled on USS New Mexico (SSN 779). These submarines will serve as pilot platforms to enable the Navy to measure savings achieved from SSL.

The new lighting fixtures are also being installed for testing on three surface ships: USS Pearl Harbor (LSD 52), USS Preble (DDG 88) and USS Chafee (DDG 90).

Although the SSL is in its early stages, the LED fixtures may one day replace existing hazardous fluorescent lights aboard submarines and surface ships. LEDs can reduce fuel use and maintenance requirements fleetwide and increase fleet readiness.

"LED lights are an immediate way to improve efficiency across the fleet," said Roger Buelow, chief technology officer at Energy Focus Inc. and principal investigator for the SSL project.

"Essentially, [SSL] lowers our workload and the amount of onboard spares that we are going to have to take on major deployments," said Chief Petty Officer Scott Brand, an electrician's mate on the New Hampshire. "That will significantly decrease the amount of space we have to consume with light bulbs."

LEDs contain no hazardous materials, unlike fluorescents, which must be stored on board until warfighters can perform expensive and intensive disposal procedures.

"The submarine community is pushing to adopt LEDs because fluorescents contain mercury," said Edward Markey, Naval Sea Systems Command (NAVSEA) Philadelphia Electrical Powergroup and TechSolutions technical point of contact on the SSL project. "Hazardous materials require special disposal procedures, costing the Navy time,

money and space."

TechSolutions worked with Energy Focus to produce patented LED fixtures that are direct replacements for fluorescents. The replacements produce the same light output, but use half the power.

"As an example, the fluorescent version of the Berth light found in every Sailor's sleeping area runs at over 10 watts and is a legendary maintenance headache due to starter and lamp failures," Buelow said. "Because of TechSolutions, the fleet now has a qualified LED version that runs at five watts, delivers the same light output and will last for a decade without maintenance."

While Energy Focus fixtures have had a good track record on Navy ships, TechSolutions' products were the first to be fully qualified by the service. Those components met the most stringent electromagnetic interference standards, requiring innovative manufacturing methods. "Making any electrical appliance tough enough to pass Navy shock and vibration tests is a challenge," Buelow said.

The request to replace noisy fluorescent bunk lights with LEDs was submitted by a sonar technician at Commander, Submarine Force, Atlantic Fleet, Norfolk, Va. After realizing the potential, TechSolutions and NAVSEA decided to expand this effort beyond bunk lights to include all the T5 8W fluorescent fixtures in the forward habitability portion of the submarine.

Provided by Office of Naval Research