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Navy's Energy Czar Examines NPS Education, Research Programs

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Article By: Kenneth A. Stewart

Assistant Secretary of the Navy – Energy, Installations and Environment retired Vice Adm. Dennis McGinn traveled to the Naval Postgraduate School (NPS), Oct. 29, to see first hand the work that students and faculty are doing to meet Secretary of the Navy Ray Mabus' call for "game-changing approaches to energy" that will transform the service's dependence on fossil fuels.

"We have three ways to think about achieving our energy goals," explained McGinn. "One of course is technology, we like to talk about biofuels, microgrids, solar wind, energy biomass, etc. Those things are important, but they are really insufficient to getting us to where we need go to achieve better warfighting effectiveness."

"We [also] need to have partnerships - partnerships across government, across state, and partnerships with the private sector to make sure that we are aware of the best practices and the best technologies ... that can help us to achieve our goals," he continued. "And the last component is cultural change. We have to increase our level of knowledge and our level of commitment through that knowledge to the central role of energy in the Navy."

Visiting Professor of Operations Research Dr. Dan Nussbaum has been at the forefront of NPS' energy programs as Chair of the university's Energy Academic Group. He described efforts to inspire the adoption of energy innovations and ongoing NPS initiatives aimed at educating senior leaders.

"The Cebrowski Institute and the Operations Research Department have been working together on a number of initiatives. We put together a course for flag officers and senior DON civilians called "Leading Innovation with an Energy Application Focus" ... that class is now mandatory for Navy flag officers and senior civilians," said Nussbaum.

Nussbaum and fellow NPS lecturer, retired Navy Cmdr. Kevin Maher, helped the campus kick off its Energy-Action Month in early October by welcoming Dr. J. Steven Herring, a retired Laboratory Fellow with the Idaho National Laboratory. Herring presented the first in a series of six biweekly Energy Academic Group sponsored seminars devoted to the subject of nuclear power, one of several energy options in which the Navy has made significant investments.

"Uranium resources and production are on the rise with the security of the uranium supply ensured for the long term," said Herring.

But nuclear power is just one of many energy resources that Mabus has challenged NPS and the Navy at large to explore.

"For most of us, energy is not something we think about everyday. We light off engines on base, in the ship's plant, or on an aircraft, and we get to work. But many of the energy changes we are making will help us as a Navy and Marine Corps to stay in the fight longer, refuel less, and extend our operational reach," Mabus wrote in Navy-wide message to the fleet, kicking off Energy Action Month.

Mabus challenged the Navy to "focus on how energy security is directly tied to our operational capabilities. It is imperative that energy security inform and shape the decisions we make from research and development to training and installation operations, to deployments aboard ship and ashore. "

NPS researchers were already well on their way in answering Mabus' challenge at many levels, so too have members of NPS' unique student body.

Operations research military faculty member Navy Cmdr. Walt DeGrange of Knoxville, Tennessee, was part of a team of NPS students, faculty and staff who sought to rethink the way naval vessels refuel and take on supplies. He and his team developed the Replenishment at Sea Planner (RASP).

"The idea was to plan optimal shipping routes that allow vessels to replenish at sea," said DeGrange. "The U.S. Navy has the greatest naval capability in the history of the world because we can stay at sea indefinitely ... There are very few foreign navies that have this capability, it's one of the things that makes our Navy so unique."

Traditionally, navies have had to pull into ports to take on fuel and supplies. The U.S. Navy is different in that it forward deploys supply ships globally, and is able to conduct replenishment operations while fleets are underway. This ability increases the speed with which naval units can deploy and saves millions of dollars annually. RASP extends that saving by optimizing when and where replenishment occurs, adding millions more in saved costs, fuel and time.

NPS research associate Anton Rowe of Honolulu, Hawaii, wrote the detailed code that makes RASP work.

"Everyone has seen video of the Air Force refueling in midair, this is the Navy's equivalent of aerial refueling operations," said Rowe.

Some of the work completed by NPS students takes seemingly simple concepts and utilizes them to great affect. In one illustrative example, a student-led thesis project involving lighting life cycle costs aboard the USNS Comfort, revealed a lighting solution that saved the Navy millions in replacement lighting costs.

USNS Comfort Chief Engineer Joseph Watts requested a life cycle lighting analysis of the Comfort in an attempt to reduce electrical, maintenance and disposal costs.



Assistant Secretary of the Navy – Energy, Installations & Environment retired Vice Adm. Dennis McGinn, left, meets with NPS students during a campus visit, Oct. 29. McGinn traveled to NPS to see first hand the work that students and faculty are doing to meet Secretary of the Navy Adm. Ray Mabus' call to seek "game-changing approaches to energy that will transform how we use it and help us to create sustainable national security for the future."

"Just keeping the lights on is quite a chore, we generate our own electricity at sea and plug into a public meter while in port; the bills are quite impressive. I was interested in reducing the cost and man hours necessary to keep the lights on," said Watts.

NPS students explored the feasibility of replacing traditional fluorescent lighting aboard the Comfort with new LED lighting fixtures and bulbs. The Comfort uses approximately 14,000 24-inch bulbs and another 14,000 48-inch bulbs all of which must be replaced annually.

"If you wanted to change a few light bulbs in your own home, you wouldn't have to take out a second mortgage, but what if the scope of the problem involved government purchases of tens of thousands of bulbs plus government employee maintenance staffing spread out over many years?" asked NPS Professor of Operations Research, retired Navy Capt. Steve Pilnick.

Other faculty-led researchers are exploring the ability of micro machines to harvest energy from generators, increasing solar cell efficacy, as well as vehicles powered by wind and wave energy that offer promising applications in unmanned watercraft. It is efforts like these, and others that garnered McGinn's continued interest in NPS.

"I want to say unequivocally that the Naval Postgraduate School is a national asset," said McGinn. "I think NPS has the waterfront covered with our energy portfolio."

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