No matter what has powered the fleet throughout history, visionary leaders have steered the service through innovation and change. With energy security more critical than ever, the Navy turns to NPS to create the next generation of energy-intelligent officers.

INSIDE:
- Chief of Naval Operations Adm. Greenert Details the Force During All-Hands Call
- Operations Research Department Awarded Prestigious-INFORMS Smith Prize
- Enlisted Special Forces Student Creates Inspired Intelligence Innovation
It’s hard to believe it has been five months since I returned to Monterey. Time has gone by quickly and yet we have come so far. These past months have only re-enforced what I already knew ... NPS is an outstanding educational institution like no other, with a devoted world-class faculty providing a one-of-a-kind, advanced education to the wildly motivated students who will matriculate to be the future leaders of the Navy, DOD, state, local and tribal governments and first responders, and to our allied countries around the world.

With the recent selection of a permanent Provost, Dr. Doug Hensler, stability and long term leadership of the institution is beginning to take form. I am very happy for the campus community and excited for the future of NPS. We still have a great deal of work ahead of us to improve our business processes, but our teams have made great strides through our teams working the Inspector General Recommendations. We have a sense of urgency in continuing our progress as we must continue to build upon our accomplishments to date and not slow down as we transition in the new leadership.

In this edition of In Review, we focus on the importance of energy independence and the need to generate a cultural shift in the Navy through education. The vulnerability of energy resources for our operations is a weakness SEACNAV has committed to resolving. He has turned to NPS to provide a cohesive critical look and research effort to begin resolving and bolstering our energy security. I encourage you to read about what NPS is doing to create energy-intelligent naval officers.

I’m happy but not surprised to report that the Naval Postgraduate School Department of Operations Research (OR) has been selected by the Institute for Operations Research and the Management Sciences (INFORMS) as the 2013 winner of the UPS George D. Smith Prize competition. One recent example of OR relevant research is the Replenishment at Sea Planner, developed by faculty and former students. The Replenishment at Sea Planner optimizes the refueling and supply replenishment process for our fleet at sea. This optimization is one of the most important aspects of maintaining a persistent forward deployed presence. Our partners at the Military Sealift Command are implementing the planning tool with the U.S. 5th Fleet. While the results are still being analyzed, we are anticipating significant cost savings and efficiencies from this work.

The NPS team is running hard and fast to continue to deliver on our educational mission while improving our business process. We will resolve the IG Recommendations as soon as possible and be better for it. For me, NPS will always be a magical place where opportunity, possibilities and measurable outcomes abound. It is my sincere honor and privilege to serve NPS and the tremendous men and women that compose it.

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On the Cover
The Navy’s fleet has been powered by a broad spectrum of sources over the past two centuries, from wind and coal, to diesel and nuclear. The service has set a determent course for energy independence, a true cultural change in how the Navy, Marine Corps view energy, but to achieve that change, they will need a new breed of energy-intelligent officer.
EMBA Program’s Latest Include FBI Contingent

Following last year’s NASA student cohort, EMBA Executive Master of Business Administration (EMBA) program is again proving the degree applies across a broad spectrum of federal agencies.

EMBA is designed to pull students from campus orientations in March, the current group included yet another contingent from outside the OOD, this time from the Federal Bureau of Investigation (FBI).

At a distance-learning effort, the EMBA program’s orientation allows students to engage in rich discussions in relationships to share and exchange career experiences, in preparation for their work in teams.

“Converging with people from the Department of Defense has shone a different light on problems that I don’t necessarily come across working for the Department of Justice,” said Rachel Hagan, a budget analyst. “It’s interesting to learn about what they experience, and to share the things that we experience, while comparing how those things match up.”

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After orientation here at NPS, the students return to their site locations where they spend four days a week and attend class once a week.

Retired Navy Cmdr. D. William D. Hatch said the program is designed to pull students away from their duties for five days a week.

“Working with other federal agencies exposes students and instructors to a culture that we may not have thought about,” said Dr. Bill Gates, Dean of the Graduate School of Business and Public Policy. “Bringing in students from across the DoD, the FBI, the Veteran’s Administration — military and civilians — enhances the richness of the experience.

“Students of the current class benefit by this, but in addition, future students to come benefit as well because our instructors are exposed to these different experiences,” Gates added.

NPS Participates in Annual Cyber Defense Exercise

NPS Senior Lecturer, retired Navy Lt. Cmdr. Christopher Eagle, is leading an NPS team in the annual National Security Agency-hosted Cyber Defense Exercise, which pits members of U.S. and Canadian service academies against each other in a battle to defend against a cyber threat.

“The object of the game is to keep the adversary out of our network,” said Eagle. “It’s an exercise to see what the future Navy is going to do and what we need to do.”

A team from U.S. special forces operators and a financial management and operations student from NPS’ recent Executive Master of Business Administration (EMBA) program is again proving the degree applies across a broad spectrum of federal agencies.

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“Students of the current class benefit by this, but in addition, future students to come benefit as well because our instructors are exposed to these different experiences,” Gates added.
The enthusiasm shown by the volunteers, expectations of the dedication and relationships being built – there’s excitement to see the results of the Monterey County Science Fair, March 8-10,” said Assistant Principal Manuel Nunez. “MOTO is only one opportunity that we as students at NPS can use to contribute positively to the lives of local youth.”

NPS Senior Marine Corps Representative Col. Mitchell McCafferty has applauded Julka and her efforts. “Capt. Julka is a force of nature,” said McCafferty. “Everything she does, she does big, and that is our hope for this program. We hope it will start small and continue to grow and make a lasting impact upon the community.”

Central Coast High School Assistant Principal Principal Melanie Nunez has equally high hopes for the program as well. “We are excited to partner with a prestigious professional organization like NPS. We appreciate their great efforts to reach out to the community,” said Nunez. “We are excited to see the results of the relationships being built – there’s so much potential.”

Assistant Superintendent for Educational Technology and Innovation Kevin McClelland is also hopeful. “MOTO has exceeded all expectations. The dedication and enthusiasm of the volunteers is reflected positively in the well presented and insightful,” said Army Maj. Andrew Johnnhees, a mechanical engineering doctoral student conducting research into semi-solid flow cell batteries at the university. “His focus on outcomes, not a specific technology or chemistry, when coming up with solutions to energy-related problems, was my biggest takeaway”

Eberhard noted that he began looking into electrical vehicles (EV) in the 80’s due to environmental and geopolitical concerns tied to the proliferation of combustion engines and fossil fuel usage. “I was not an EV advocate when I started Tesla, however, I did some math to determine what was the best choice and became convinced that electric was the solution,” he said.

Eberhard uses his all-electric sports car to demonstrate the efficiency and high performance that is possible, adding that he drove a Tesla Model S to campus on $3 worth of electricity.

He also discussed improvements in battery technology, and made a case for the increasing efficiency, productivity and practicality of electric vehicles. “Electric cars are by far the best choice… The bigger you make a gasoline engine, the less efficient it is. With electric, it’s the opposite — the nearly you go to the engine, the more efficient the vehicle,” he said.

NPS Faculty, Staff Participate in Local Middle School Science Fair

Defense Resources Management Institute Associate Professor Natalie Webb helped recruit NPS military staff to participate in the Monterey County Science Fair, Feb. 21.

Marine Corps Staff Deputy for Research and Technology was one such participant, serving as a guest judge at the event to the applause of fair organizers.

“Our students are using the ISM fair to prepare themselves for the Monterey County Science March, 8-10,” said Army Commanding General of its kind … It is a hybrid of cyber and psychological operations procure a guest lecture through the Defense Energy Program’s weekly lecture series. “Eberhard’s presentation was critically important, this is about education over training,” said Jacobs. “You have to figure out how to get the knowledge that you are learning here, injected into your commander’s planning cycle. It is our job to get them to think about civil affairs.”

Army Civil Affairs Officer Challenges NPS Students


The hybrid graduate certificate program is tailored specifically to meet the needs of both civil affairs and psychological operations professionals in the public sector. It is offered for the first time this year and will run for two years with seven members, and has now signed up its 1,000th member.

Army Reserve Maj. Gen. Jan M. Davis, was briefed by faculty and select students from the cyber systems and operations (CSO) program in the Information Dominance Center for Excellence, Feb. 27. Davis received an update on network-hacking countermeasures that have yielded promising results in preliminary testing.

Dominance Center for Excellence, Lt. Gen. Jon M. Davis, was briefed by faculty and select students from the cyber systems and operations (CSO) program in the Information Dominance Center for Excellence, Feb. 27. Davis received an update on network-hacking countermeasures that have yielded promising results in preliminary testing.

Davis, an NPS alumnus, spoke of the importance of the university’s cyber warfare research, and the need to build a cadre of professional cyber experts to protect U.S. interests.

“This school has strategic value to our nation,” said Davis. “This is a critical time … We are going to need 6,000 people in the next three years to build a cyber force.”


**Systems Engineering Body of Knowledge Honored with Prestigious INCOSE Award**

NPS Professor of Systems Engineering (SE), Dr. Dave Owlett, and his colleague, Stevens Institute of Technology Distinguished Research Professor Dr. Art Pytser, have been presented with the award for their thesis titled, “Manpower Requirements Estimation for Unmanned Carrier Launched Airborne and Strike Squadrons.” The CNP Award is presented to a graduating student who has demonstrated academic excellence and leadership potential in the area of Manpower Systems Analysis.

**Distinguished Professor Recognized for 25 Years of Service**

Distinguished Professor Emeritus Thomas Bruneau of the NPS Department of National Security Affairs (NSA) was recognized for his 25 years of service to the Navy during a short ceremony, March 7. “We are here to honor a great guy who probably hired most of the people in this room,” said NSA Department Chair, Dr. Harald Trinkhaus.

Bruneau has a storied career at NPS, and is looking for workable solutions to Navy, Marine Corps, and defense-related problems. “CRUSER is an inclusive community... It encompasses successful research, education and experimentation efforts in unmanned systems currently ongoing at NPS and across the national enterprise,” said retired Navy Capt. and NPS Professor of Practice Jeff Kline, who led the effort for his first two years. Members of the CRUSER community include researchers, students past and present, faculty, members from across all branches of the military, several government agencies, industry, other academic institutions and beyond.

**Business School Sets Up Virtual Thesis Day**

Faculty and staff in NPS Graduate School of Business and Public Policy overviewed current travel limitations by setting up the first virtual Thesis Day, March 11. A frequent event, Thesis Day provides an opportunity for select top-performing students to present their research to senior Department of the Navy leaders. But this year, student presentations were held via live video teleconference to Navy leadership, and at multiple locations.

“This smooth and trouble free, first fully-virtual thesis day event may have ensured that this is done for the foreseeable future,” said N1 Senior Program Manager Wayne Wagner, who oversees research activities related to the Navy’s Office of Manpower, Personnel, Training and Education.

The occasion also marks the presentation of the Chief of Naval Personnel (CPN) Award for Academic Excellence in Manpower, Personnel and Training Analysis. Cmdr. Gary Lazarro was honored with the award for his thesis that provides the most significant value to its stakeholders.

**Defense Analysis Professor’s Book Opens Windows Into Dark Networks**

Dr. Chung’s commitment to the Naval Postgraduate School’s mission is demonstrated by his innovation for interdisciplinary and collaborative research, “said Moser. The book, titled “Manpower Requirements Estimation for Unmanned Carrier Launched Airborne and Strike Squadrons,” was published in December 2012. It provides a standardized set of curriculum and content recommendations to align academicians with current systems engineering research, and to guide the development and improvement of graduate degree programs in systems engineering.

Both projects are published online, with the SEBoK publishing in wiki format, that enables content to be easily updated, constantly kept fresh, and reflective of the latest knowledge and best practices from the systems engineering community.

“With the SEBoK, we organized the knowledge for systems engineers,” said Olwell. “It was completed on time, on budget, and exceeded expectations.”

SEBoK published April 2, 2012, is the recognized and authoritative source of information on the systems engineering discipline, consisting of hundreds of articles, glossary terms and links to resources. “With the SEBoK, we organized the knowledge for systems engineers so it’s understandable and has a clear taxonomy and structure,” said Pytser. “There are articles about each major topic in the discipline, more articles on how they relate to each other, and information on the primary references for systems engineering.”

GRICSE, which was published in Dec. 2012, provides a standardized set of curriculum and content recommendations to align academicians with current systems engineering research, and to guide the development and improvement of graduate degree programs in systems engineering.

“First, the SEBoK project has a wide-reaching and deep effect on the practice of systems engineering,” said Olwell. “It was completed on time, on budget, and exceeded expectations.”

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Assistant Professor Sean Everton

Everton is well versed in the lab techniques which he himself helped develop while serving as the CORE Lab Co-director. He teaches defense analysis (DA) courses on both the tracking and disrupting of dark networks and dynamic network analysis. His work is being used by U.S. and international DA students to reveal criminal and insurgent group structures and dynamics.
Students demonstrate a remote-controlled quadrotor aerial vehicle during Joint Interagency Field Experiment (JIFX) 12-2, a broad, interagency test and evaluation program for technologies for possible operational and first responder use.

NPS Continues Collaborative, Interagency Field Experimentation Program

By MC1 Grant A. Atteno

STUDENTS, FACULTY AND STAFF from the Naval Postgraduate School conducted Joint Interagency Field Experiment (JIFX) 12-2 with representatives from the Department of Defense’s combatant commands (COCOMs), as well as federal, local, and state agencies at Camp Roberts, Calif., Feb. 11–14. Sponsored by the Office of the Secretary of Defense’s Joint Operations Support directorate, and the Department of Homeland Security, JIFX is a collaborative field experimentation program that allows a broad group of students, researchers, defense industry leaders and military members to test, evaluate and collaboratively develop new technologies, as well as define emerging requirements.

“JIFX is a sponsored research program of the Office of the Secretary of Defense’s Joint Operations Support directorate,” said NPS Department of Information Sciences Associate Professor, Dr. Ray Buettner, director of field experimentation at NPS. “They have funded NPS to provide an environment for the combatant commanders — six geographic and three non-geographic — in which they can rapidly evaluate and refine existing requirements and potentially identify new requirements to their capability challenges to the warfighter,” he continued.

NPS coordinated the event where graduate students and faculty were able to execute experiments and demonstrate research projects developed at the university.

“JIFX is a unique opportunity of research that is purely for our students, faculty, COCOM partners and other government agencies to come together in an experimental way,” said NPS Intern Program Rear Adm. Ian E. Tighe. “It’s a chance to test out new ideas and innovations, and for our students to actually see it all come together.”

“Student learning is not just theoretical back in the classroom, or even the lab, but here they actually get to do something practical with the knowledge gained while studying at NPS,” continued Tighe.

All participants at JIFX had the potential to benefit from the collaborative nature of the field experiment.

“Our NPS students and faculty benefit from JIFX because we’re in the middle between bright technologists from the labs, the defense industry, other universities and the warfighter,” said Buettner. “This exercise provides militarily-relevant, unique graduate education opportunities for our students.

“The sponsor also benefits because the COCOMs better understand technologies and the potential of those technologies to solve their problems,” added Buettner.

The series of field experiments allowed for an open dialogue on technologies demonstrated and, with participation from California National Guard units, researchers and industry representatives were provided with direct feedback from the warfighters’ perspective on the applicability of the technology demonstrated.

“The companies, industry and lab participants benefit because they better understand what the warfighter actually needs to do and how their particular products need to be changed to meet that need,” said Buettner.

Of critical importance to the collaborative and exploratory nature of the program is the end users, direct interaction with developmental technologies.

“This environment is pre-acquisition,” said Buettner. “There are no sales involved with this experiment. Because we have academics running the environment, it’s about research, and not acquisition. We’re able to lower the barriers to collaboration.”

For NPS student Navy Lt. Chris Gutierrez, who attended JIFX to demonstrate his thesis work on netted line-of-sight communication equipment based on netted indium technology, the ability to take his work outside the classroom and into the field was highly beneficial.

“You can get a lot from the classroom, but to really get out and meet other folks that are looking at the same problems that you’re interested in is invaluable,” said Gutierrez. “This is especially helpful as a thesis student at NPS. We’re here doing research on things that might affect the Navy and the military in the future.”

The collaboration between COCOM representatives, the defense industry, warfighters, and the technologists working towards solutions to their challenges provided an excellent opportunity to further student learning while contributing solutions to real-world problems.

“This is why we do this field experiment,” said Buettner. “It provides students the opportunity to engage in thesis work that not only meets the bar for a master’s degree, but also they get to do something that supports the larger effort by supporting the COCOMs and warfighters.”

Representatives of agencies from outside of DOD are also benefiting from the support of COCOM participation at JIFX.

“Each of the COCOMs has a requirement to provide defense support to civil authorities,” said Buettner. “Often times, we find that only the people agencies work with the military in the middle of a disaster. That’s too late. You have to build ties and connections to figure out what works and doesn’t work before that event.”

Many of the technologies demonstrated during JIFX had crossover implications between the DOD and other federal, state and local agencies.

According to Buettner, NPS-hosted exercises like JIFX enhance the quality of education for graduate students, as well as provide solutions to complex problems the nation is facing.

“In my opinion, this is exactly the kind of activity that demonstrates NPS’ uniquely relevant military education that you can’t get at other universities. This is why the country needs a place like the Naval Postgraduate School,” he said.

Students, faculty and staff from the Naval Postgraduate School conducted Joint Interagency Field Experiment (JIFX) 12-2 with representatives from the Department of Defense’s combatant commands (COCOMs), as well as federal, local, and state agencies at Camp Roberts, Calif., Feb. 11–14. Sponsored by the Office of the Secretary of Defense’s Joint Operations Support directorate, and the Department of Homeland Security, the Department of Defense’s Joint Operations Support directorate, and the Department of Defense. Along with Robots in the Roses, the group coordinates several innovation workshops in addition to regular campus meetings and communications.

Robotics Takes Center Stage During Annual Research Fair

Robots of every shape, size and purpose dotted the academic quad as the Naval Postgraduate School’s Consortium for Robotics and Unmanned Systems Education and Research (CRUSER) once again hosted their annual Robots in the Roses Research Fair, April 11.

The annual event brings the campus community together to spotlight existing research projects throughout every department, encouraging maximum collaboration across the university.

“Robots in the Roses is wonderful because you get a chance to meet interested students and show them some interesting devices,” said Steven Jacobs of the physics department. “It’s great exposure to the community … It helps put our department out there and really helps to showcase what we’ve been working on.”

Researchers displayed robotics platforms large and small — everything from bird-like bots that seek out and ride upon thermals, to small, unmanned watercraft capable of sensing threats in harbors.

“Robots in the Roses is an annual event that allows faculty and students to showcase their research in unmanned systems and present them to the broader community,” said CRUSER Director, retired Navy Capt. Jeff Kline. “It’s on one-hand very useful for the students to come out and see the variety of the things that are going on, but it’s also very good for the faculty to see what other faculty members are doing in order to find opportunities for collaboration.”

NPS’ CRUSER provides a collaborative environment and community of interest for the advancement of unmanned systems education and research endeavors across the Navy, Marine Corps and Department of Defense. Along with Robots in the Roses, the group coordinates several innovation workshops in addition to regular campus meetings and communications.
The military’s dependence on fossil fuels is a weakness that must be resolved. Secretary of the Navy Ray Mabus turns to NPS to help generate service-wide change through educating energy-intelligent Navy and Marine Corps officers.

By Dale M. Kuska

The Numbers Are Staggering.

The U.S. Department of Defense is the single largest consumer of petroleum fuels on the planet, burning up more than $17 billion in FY11 on oil. While aircraft are by far the thirstiest of DOD’s assets, the chain of procuring and delivering that fuel, regardless of what’s using it, is ripe for exploitation by the enemy.

It’s a tragic lesson that has been forcibly learned on the hot sands of the Middle East, where convoy after convoy, largely consisting of fuel, is ripe for exploitation by the enemy. Secretary of the Navy Ray Mabus.

“We believe because we pay those increases from our Operations and Maintenance accounts, price spikes can result in less steaming, flying and training for our Sailors and Marines,” Mabus continued. “We must include alternative means of powering the fleet because energy efficiencies and alternative energy will improve combat effectiveness.”

“The Navy has never been away from attacking vulnerability through innovation and determination. When legendary Adm. Hyman G. Rickover, then a captain, led the development of naval nuclear propulsion, it was wrought with criticism from the inner defense circles of the late 1940s and ’50s, considered too dangerous and too expensive. But the results of the Navy’s determination are undeniable, with 80 Navy vessels now powered by nuclear propulsion,” he added.

“The Navy’s partnership with Naval Postgraduate School (NPS) helps prepare our future leaders to share their own success stories. Collectively, the components all add up to what the institution has coined the Defense Energy program,” Mabus said.

Secretary Mabus said the educational programs Mabus and Hicks refer to are a collection of four existing NPS degrees — operations analysis, electrical engineering, financial management and mechanical engineering — modified to include a specialized track of energy courses on top of their regular coursework. Collectively students have already made their way through the criticals, with the first energy students graduating this past March.

In addition, the university has also developed an energy certificate program that has been well received for students outside of the energy cohort, and an executive education program due to kick off this summer for more senior officers.

“We view culture change as that untapped gold mine of efficiency, cost savings and resource efficiency that we can really take advantage of through a dedicated effort,” and Hicks.

“One of the first important steps is happening right here at the Naval Postgraduate School where you’re creating curriculum for the future leaders of the Navy and Marine Corps to become well-versed in energy security, technology, policy, and how they are all interconnected,” he added.

“...energy innovators onto campus to share their own success stories. Collectively, the components all add up to what the institution has coined the Defense Energy program.”

According to retired Navy Cmdr. Mary Sims, Associate Provost who helped develop the program due to kick off this past March.

“...within the core of their discussions, and their goals, are quite similar. We’re seeding the future out here. The seeds we plant here are going to be the plants that grow in the future, and we want them to grow with energy in mind,” added Charette. “That’s why we have this thesis support program. With students here at NPS, we can get not only a great thesis product, we get the product and the person.”

“...a key speaker is playing top leadership roles within the operational units charged with making the Navy and Marine Corps more energy independent.”

“...the event provided an opportunity for officers at every level to participate in the educational process — something required for true cultural change.”

“If we are successful in leading that culture change, then energy becomes a part of every consideration the Navy has,” she added. “It’s not something you don’t need to introduce or encourage people to do, simply because it’s natural.”

This message is being delivered loud and clear to students in the program, who actively attend the weekly energy seminars organized by mechanical and aerospace engineering and strategy and national security. The military’s dependence on fossil fuels is a weakness that must be resolved. Secretary of the Navy Ray Mabus turns to NPS to help generate service-wide change through educating energy-intelligent Navy and Marine Corps officers.

The military’s dependence on fossil fuels is a weakness that must be resolved. Secretary of the Navy Ray Mabus turns to NPS to help generate service-wide change through educating energy-intelligent Navy and Marine Corps officers.

By Dale M. Kuska

The Numbers Are Staggering.

The U.S. Department of Defense is the single largest consumer of petroleum fuels on the planet, burning up more than $17 billion in FY11 on oil. While aircraft are by far the thirstiest of DOD’s assets, the chain of procuring and delivering that fuel, regardless of what’s using it, is ripe for exploitation by the enemy.

It’s a tragic lesson that has been forcibly learned on the hot sands of the Middle East, where convoy after convoy, largely consisting of fuel, is ripe for exploitation by the enemy. Secretary of the Navy Ray Mabus.

“We believe because we pay those increases from our Operations and Maintenance accounts, price spikes can result in less steaming, flying and training for our Sailors and Marines,” Mabus continued. “We must include alternative means of powering the fleet because energy efficiencies and alternative energy will improve combat effectiveness.”

“The Navy has never been away from attacking vulnerability through innovation and determination. When legendary Adm. Hyman G. Rickover, then a captain, led the development of naval nuclear propulsion, it was wrought with criticism from the inner defense circles of the late 1940s and ’50s, considered too dangerous and too expensive. But the results of the Navy’s determination are undeniable, with 80 Navy vessels now powered by nuclear propulsion,” he added.

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ENERGY EFFICIENT = COMBAT EFFECTIVE

The message is loud and clear... The reliance of the U.S. military on fossil fuels from tumultuous regions of the world is a fundamental weakness that must be resolved. For the Navy and Marine Corps, Secretary Ray Mabus outlined five core energy security goals that would lead his services to mission readiness.

From finding alternative energy sources to seeking smarter acquisition processes, NPS Defense Energy program, its educational deliverables and innovative research efforts, provide a full force attack on all fronts, playing a lead role in creating the cultural change needed for the Navy of tomorrow.

SECNAV ENERGY SECURITY GOALS

1. INCREASE ALTERNATIVE ENERGY DEPARTMENT-WIDE

   By 2020, 10% of total department energy consumption will come from alternative sources.

2. INCREASE ALTERNATIVE ENERGY SOURCES ABOARD

   By 2020, at least 50% of shore-based energy requirements will be met by alternative sources.

3. REDUCE NON-TACTICAL PETROLEUM USE

   By 2020, department fuel use reduces petroleum use in vehicles by 50%.

4. SAIL THE “GREAT GREEN FLEET”

   Department will demonstrate a green strike group in local operations by 2012.

5. ENERGY EFFICIENT ACQUISITION

   Transition of energy contracts will be mandatory when awarding contracts for systems and buildings.

ENERGY SECURITY IS NATIONAL SECURITY

80%

OF CONVOYS IN AFGHANISTAN ARE DEVOTED TO FUEL TRANSPORTATION

40 MILLION GALLONS IN 2010 PER HERALDS A MAJOR INVESTMENT IN DEFENSE LOGISTICS AGENCY ENERGY

18%

ARMY ESTIMATE OF CASUALTIES IN IRAQ AND AFGHANISTAN RELATED TO GROUND RESUPPLY OPERATIONS

1 IN 24 2003-2007 U.S. ARMY CASUALTY RATE FOR FUEL CONVOYS IN AFGHANISTAN

10%

USMC ESTIMATE OF BATTLEFIELD CASUALTIES IN IRAQ AND AFGHANISTAN RELATED TO CONVOY OPERATIONS

1 IN 50 2010 U.S. MARINE CORPS CASUALTY RATE FOR FUEL AND WATER CONVOYS IN AFGHANISTAN

3,000 U.S. TROOP AND CONTRACTOR DEATHS OR INJURIES IN IRAQ AND AFGHANISTAN FROM ATTACKS ON FUEL SUPPLY CONVOYS FROM 2003-2007

ENERGY-RLEVANT STUDENT RESEARCH

Batteries on the Battlefield: Developing a Methodology to Estimate the Fully Burdened Cost to DOA

Blaming Electricity via Relay Satellites in Support of Deployed Combat Forces

Benefit Cost Analysis for Transitioning the U.S. Navy from Petroleum to Synthetic Fuel Resources

Combustion and Certification of Biofuels

Comparison of Hypervelocity Impacts with Respect to the Potential Impacts and the Effects of Transient Plasma Ignition in a Compression-Ignition Engine

Comparison Analysis of Fedded vs Mechanically Driven Propulsion

Cost-Benefit Analysis of the Smart Power Infrastructure Demonstration for Energy Reliability and Security

Cost Estimation Analysis of U.S. Navy Ship Fuel Savings Techniques and Technologies

Cost Estimation of Biofuel for Naval Aviation

Battling for the Green Fleet

Design and Development of Wireless Power Transmission for Unmanned Air Vehicles

Efficiency Improvements of Navy Gas Turbines

Estimating the Fully Burdened Cost of Fuel for a Naval Aviation Fixed Wing Platform

Evaluating the Impact of the Fully Burdened Cost of Fuel in Trade Space Analysis

Fully Burdened Cost of Fuel Using Input-Output Analysis

High-Performance Solid-State Li-Ion Battery with Ultra-Safe Thermally-Stable Nonflammable Graft Copolymer Electrolyte

Impact of Rechargeable Batteries

Integration of Detonation-Based Combustion into Hybrid Gas Turbine Systems

Lead Acido-Solid-Oxide Fuel Cells for Medium- and Large-Scale Energy Storage

Micro Electro-Mechanical Systems Energy Harvesting

Modeling Heterogeneous Carbon Nanotube Networks for Photovoltaic Applications Using Silvaco ATLAS Software

Multi-Material Optoelectronics: New Paradigm for Achieving High Energy Density Capacitors

Nanostructured and Multifunctional Materials for Energy Storage

Novel Alkaline Direct Aerial Graphite Hybrid for Superconductive Energy Storage

Optimal Design of Piezoelectric Materials for Maximal Energy Harvesting

Optimization of Vertical Axis Wind Turbine Arrays

Realization of Micro-Ion Thrusters through Carbon Nanotube-Based Engine Components

Stability Analysis of a Constant Power Load Serviced by a Buck Converter as the Source Impedance Varies

Synthesis and Characterization of Nitrogen-Containing Graphene

Technical Feasibility Study of a Green Area

Transport Imaging in Solar Cells

NPS’ DEFENSE ENERGY PROGRAM

DEGREE PROGRAMS: Four graduate degree programs currently offer energy specialty tracks — Operations Analysis, Naval and Mechanical Engineering, Electronic Systems Engineering, and Environmental Science and Policy. These three focus areas — energy general education, energy science and technology, and energy policy and analysis.

ACADEMIC CERTIFICATES: The Academic Certificate Program in Energy is uniquely tailored for each resident degree or distance learning student to provide the basics of energy technology and expose a wider range of DOD energy issues. The certificate requires successful completion of a minimum of three graduate courses including ‘Fundamentals of Energy’ and electives in one of three focus areas — general education, energy science and technology, or energy policy and analysis.

EXECUTIVE EDUCATION: To accelerate energy literacy and the efficient adoption of DOD energy goals, NPS offers executive-level education to key influencers in the DOD and partner industries. The goal is to catalyze new policies, programs and practices across the DOD in two resident-two week courses at NPS.

DEFENSE ENERGY SPEAKERS SEMINAR: NPS’ academic programs in defense energy are supplemented by the seminar series which provides a forum for leading voices within the field, practitioners and other defense energy influencers. These professionals give presentations, engage in brown bag discussions and facilitate informal gatherings that encourage faculty and student discussion over current defense energy issues. The Defense Energy Speakers’ Seminars are a permanent part of NPS’ Defense Energy program, and a key to its real-world relevance.
The energy investments we’re making both afloat and ashore are really vital to national security. This effort is really about increasing our combat capability, improving our mission effectiveness, and reducing our dependence on volatile fuel markets and increasingly brittle electric grids.”

— DEPUTY ASSC. SEC. OF THE NAVY FOR ENERGY

THOMAS NICKES

In Review  •  April 2013

THE NAVAL POSTGRADUATE SCHOOL's Department of Operations Research (OR) was awarded the 2013 UPS George D. Smith Prize by the Institute for Operations Research and the Management Sciences (INFORMS) in a nod to the first OR degree program in the United States.

The distinguished award is presented by INFORMS to an institution that demonstrates the “effective and innovative preparation of students to be good practitioners of operations research, management science or analytics.” NPS’ selection was announced at the INFORMS 2013 Franz Edelman Awards Gala on April 8 in San Antonio, Texas.

“It’s an honor to be recognized as an exceptional program. Certainly what we strive to do is produce exceptional practitioners of operations research who graduate from our program and go on to make a difference in the world.” NPS OR department Chairman Dr. Rob Dell.

As part of the nomination packet, the OR department highlighted some of the best practices that make the university’s program successful.

“Most of all they bring operational insight and experience that students haven’t traditionally had in their native curricula,” said OR Assistant Professor Michael Atkinson. “They have the dual perspective of time as both a student and faculty member at NPS. They are going to have an impact.”

“While I have seen a quantum change in the Navy’s prioritization of energy, what we provide to our students is awareness, tools to use measurement techniques, and the ability to analyze. Ultimately our most important product will always be our students.”

— CHAIRMAN OF THE DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING DR. KNOX MILLISAPS

NPS OR department wins Prestigious INFORMS Award

By Amanda D. Stein

NPS Energy Warriors: Energy-relevant research at NPS hits on all fronts. From expert analyses to futuristic discovery to smarter acquisition. Picture left are Coast Guard Lt. j.g. Adam Paz and NIST Lt. j.g. John Peterson withreaker’s sun blends they are analyzing for possible naval applications. Shown center is Lt. Paul Camp, whose ionization test chamber will aid in propulsion research using carbon nanotubes. And pictured right, Marine Corps Capt. Darrell R. Brown holds a rechargeable battery similar to the ones he used in his life cycle cost analyses of using rechargeable batteries vs. disposable batteries.

While the faculty are critical to the success of the program, there is a strong consensus among the OR faculty that the caliber of students who come through the program sets it apart from other academic institutions.

“As part of the nomination packet, the OR department highlighted some of the best practices that make the university’s program successful. Among them, Dell noted, are the exceptional people who make up the NPS community.

“We have a wonderful military faculty who come to us after having served a couple of tours outside, as practitioners, and they get to come back as faculty and make an impact on our students in a very direct way,” said Dell. “We also have our OR civilian faculty who obtain a significant portion of their salaries through reimbursable research. That keeps us woven into the fabric of what the DOD needs to have solved. We, the military and civilian faculty, get to bring those problems back to our classrooms.”

While the faculty are critical to the success of the program, there is a strong consensus among the OR faculty that the caliber of students who come through the program sets it apart from other academic institutions.

“By far, the students make the department. They are smart, mature and hard-working,” said OR Assistant Professor Michael Atkinson. “Most of all they bring operational insight and experience that students of other institutions cannot match. Often, they are the ones proposing research topics to us based on their own experience, rather than the other way around.”

NPS OR military faculty member Cmdr. Walt DeGrange has had the dual perspective of time as both a student and faculty member at NPS. He graduated from the OR department in 2001, and returned in 2011 to teach in the department. He sees every day the fresh ideas and perspectives that students bring to the classroom.

“One of the things that sets us apart is the leadership aspect,” said DeGrange. “Other programs have to address questions of how to teach leadership … Our students have leadership skills before they get here.”

The students who enter the OR department already have an idea of some of the challenges facing Soldiers, Sailors, Airmen and Marines around the world. This understanding often translates into applicable research through their thesis work.

“The thesis is an essential part of producing a good practitioner,” explained Dell. “It’s really about making sure that students are working on those projects that are relevant to the military. And by the nature of our students, it’s hard not to do that. They really do work on problems that are going to have an impact.”

The Smith Prize, now in its second year and awarded by INFORMS, is named in honor of the late Chief Executive Officer for UPS, a strong supporter of operations research. The award is intended to support the collaboration between industry and academia to further OR practices.
Chief of Naval Operations Adm. Jonathan Greenert outlines the future force to students, faculty and staff during an all-hands call in King Auditorium, Feb. 1.

**Chief of Naval Operations Delivers All-Hands Message at NPS**

By Amanda D. Stein

**THE CHIEF OF Naval Operations visited the Naval Postgraduate School for an all-hands call, Feb. 1. **

Adm. Jonathan W. Greenert met with NPS students, faculty and staff to discuss where the Navy is presently, and where leadership hopes to focus efforts in the future. He took questions from attendees, addressing a range of issues that matter to the Navy community — from budget and resources to the role of training and education for the fleet.

“I want to tell you right off the bat, this institution is a very big part of where I want to take this Navy, and where whoever relieves me has to take this Navy. The Naval Postgraduate School is one of our big three institutions,” began Greenert. “We grow kids up to be officers at the Naval Academy; we do our educating for warfare at the Naval War College, but here is where we make Jedis in a lot of areas that are very unique to our Navy — acoustics, cyber, financial management and a whole host of things.

“That balance of postgraduate education and the research you do here is very important,” he continued. “We are fortunate to have the students that we attract, the world-renowned faculty that we have here, and the administration that makes it all come together.”

In addressing the current concerns of the Navy, Greenert pointed to his four main areas of focus — sexual assault, suicide, operations tempo and manning. He noted that sexual assault and suicide rates in the Navy are unacceptably high, and steps are being taken to ensure those numbers are reduced.

With operations tempo and manning issues, he emphasized the need to have the maintenance and manpower to successfully operate forward.

Greenert spoke about the importance of establishing or maintaining a Navy presence at the major maritime crossroads — such as the Strait of Hormuz and the Strait of Malacca. He reinforced that strategic operations are critical for the Navy to fulfill the mission of ensuring national and international security in the maritime domain.

He provided an overview of current deployments and operations around the world, highlighting the focus on strategically positioning the fleet. He pointed to specific areas — including Djibouti, Singapore and Australia — where U.S. Navy and Marine manpower has been increased for readiness.

“We need to continue to develop places around the strategic maritime crossroads. That is where the stuff of the world, that makes the world economy tick, goes through,” Greenert explained. “We have to have access to these places where we can repair, restore, relax and refurbish. These will be a big part of our future as we operate forward. Warfighting first, and be ready if you have to operate forward. You have to have the things to support it.”

In addressing the future of the Navy, he looked at capabilities such as the Unmanned Combat Air Systems, new littoral Combat Ships, Mobile Landing Platform and Joint High-Speed Vessels that the Navy is expecting to deploy in the future. The goal, he explained, is to swap out the new additions to the fleet to operations such as humanitarian assistance and disaster relief and counter-terrorism ships for operations where their capabilities would be needed most.

Student questions varied, with a number revolving around the difficult choices that fiscal uncertainty demands. Greenert addressed the unknown surrounding the continuing resolution and sequestration, and was quick to point out that having capable warfighters with reliable equipment is the priority.

“Warfighting has he first,” he said. “That’s how we have to think of things. How does whatever you are going to decide on affect the warfighter?”

In closing his presentation to the audience, the CNO expressed his appreciation for the students’ candid questions, and in their ability to lead the future fleet.

“It’s really invigorating to get the questions that I’m getting. You guys are thinking about things, and my time is limited. And knowing that when I go, people like you will come in and take care of the Navy makes me feel good and I appreciate it very much.”

Greenert assumed his current position as the 30th Chief of Naval Operations on September 23, 2011. He previously served in various fleet command and support assignments, including Commander of U.S. 7th Fleet and Vice Chief of Naval Operations.

**NORAD, USNORTHCOM Commander Visits NPS, CHDS**

Army Gen. Charles H. Jacoby Jr., Commander of the North American Aerospace Defense Command (NORAD) and U.S. Northern Command (USNORTHCOM), visited the Naval Postgraduate School, Jan. 31. He spent much of his visit with students and faculty in the university’s Center for Homeland Defense and Security, and expressed his initial impressions of the students, and on education as a whole, during a gathering with the group near the end of his visit.

“This is a great group to have sitting together as a team,” Jacoby said. “I am a big believer that if we are down to our last dollar, we should spend it on education.”

Jacoby’s visit to NPS was more directly connected to his role with USNORTHCOM, which was established in 2002 to provide command and control of Department of Defense homeland defense efforts and to coordinate defense support of civil authorities.

CHDS’ diverse student population of professionals and first responders at local, state and federal levels left Jacoby impressed by the many perspectives addressing homeland security’s challenges. He continued, “I am very happy that we have this talented group from their respective agencies thinking, collaborating and working together here on homeland security.”

“We are like a petri dish where different stakeholders can conduct research and grow solutions to our nation’s most pressing homeland security issues,” added CHDS Executive Director Dr. Ted Lewis.

CHDS has been working with USNORTHCOM to provide advanced education to civilian and active-duty officers from the command for the last 11 years. Over that span, 29 USNORTHCOM students have graduated from NPS with advanced degrees.

The command, however, has been challenged in recent years to dedicate personnel to the program, one of the reasons Jacoby himself wanted to explore the center. By the end of his visit, he expressed a recommittance to filling his available seats.

In addition to meeting with students and faculty at CHDS, Jacoby met with NPS leadership and received briefings on cutting-edge research and technology programs at the university. He also toured NPS’ Common Operational Research Environment Laboratory where he met with students and faculty working together to illuminate criminal and insurgent networks.

In closing, Jacoby expressed a positive review of his time spent on campus, and was committed to continuing the dialogue. “I hope we will continue to work together,” said Jacoby. “Everything that you are doing here is important to us. I have about a million questions for you, and I look forward to continuing this dialogue.”


The idea first came to me back in 2009, when I was deployed to Kunduz and partnered with the 3rd Commando Kandak in Regional Command South. ‘One of my responsibilities was to manage SSE after a village had been cleared,’ said Linnel.

‘After the mission, I would spend about three hours consolidating all of the pictures, reports and information gathered off the objective,’ he continued. ‘After I present the information, I’d get a ‘great job,’ and the information would go nowhere.’

Special operations teams are commonly given the secondary task of moving through a maze of compounds after their primary task of clearing has been completed. Their mandate is to gather the myriad clues that help ground commanders make sense of their areas of operations.

Linnel’s application attempts to simplify the process of site exploitation by giving context to the plethora of pictures, faces, documents and reports born of complex operations.

‘This is about enabling analysts to rapidly connect the dots and better inform decision makers,’ said CORE Lab Co-Director Army Special Forces Col. Greg Wilson. ‘The ability to rapidly exploit this type of information can enable us to get inside the enemy’s decision cycle.’

‘A visual Rolodex for Afghanistan is one of the many by-products Lighthouse SSE produces,’ added Linnel. ‘I take a photo, it is geo-referenced, and metadata is stamped on it with relevant information about the search and the organization that produced the report.’

The application is run on an Android OS-based mobile device and connected to a tactical network via a wave relay radio system.

‘By using the wave relay radio, you are able to update on the move and share information in real-time, lending context to people moving around on the ground as well as the command and control element back at the Forward Operating Base,’ said Linnel. ‘This application allows analysts to see things through the operator’s eyes.’

‘Terrorist networks are quick to adapt after strike operations with the evidence found on targets often fleeting in nature,’ said Wilson. ‘At Class Linnel’s work promises to have a significant impact on our ability to rapidly gather, fuse and exploit the right information.’

‘When you begin to apply advanced analytical methodology to the exploited intelligence from the objective, you begin to see networks and their vulnerabilities.’

The first version of Linnel’s application transitioned to pilot field-testing in early March. Subsequent versions will exploit advances in 3-D modeling with the goal of creating a device that is capable of molding individual photographs together to develop a complete model of the structure inside.

‘In the future we will be able to stand up photos within the application to rapidly gather, fuse and exploit the right information.’

‘More efficient.’

‘Terrorist networks are quick to adapt after strike operations with the evidence found on targets often fleeting in nature,’ said Wilson. ‘At Class Linnel’s work promises to have a significant impact on our ability to rapidly gather, fuse and exploit the right information.’

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For more information, contact:

Gary Lucas
Lt. Cmdr. Andy Lucas
Lt. Phil Richter

The No. 1 priority is to cut the noise and get the relevant information to the right people at the right time in the right format. ‘When they see something important, the system will say it. When they see the information is insufficient, it will say that too.”

Tactical Communications

Students Test QR Codes for Tactical Communications

NPS students, Lt. Cmdr. Andy Lucas and Lt. Phil Richter, are pictured in front of a nearly 121-square-meter Quick Response (QR) code on the roof of NPS’ King Auditorium. They painted the code as part of their thesis project examining the use of QR codes as communication tools in tactical environments.

‘What we’re going for is the ability to communicate between tactical units in an emissions-controlled environment,’ said Lucas.

‘Essentially, we could use this technology to ensure stealth communication that will not pinpoint our location to an adversary.’

QR codes are machine-readable matrix labels that contain encoded information. Airborne assets will fly over the painted code to test the ability to glean encoded information from various altitudes. Lucas and Richter also hope to test the ability of orbiting satellites to read information from the auditorium rooftop.

‘This QR code essentially points to a link that is associated with the CRUSER lab,’ said Lucas. ‘What we’re trying to test is whether or not airborne assets, whether they are aircraft or satellites, are able to get a successful image of the [QR code] that we are able to decode. Hopefully we’ll get a QR message sent to space.’

Lucas and Richter are enrolled in NPS’ Joint Command, Control, Communications, Computers and Intelligence (C4) curriculum.
NPS Students’ Thesis Addresses the Threat of Active Shooters

By Amanda D. Stein

EVERY DAY, THE men and women of the armed forces put themselves in harm’s way. Recent NPS graduates, U.S. Army Majors Charles Ergenbright and Sean Hubbard, are no different — and they commit to countless hours of training for just those situations when their skills mean the difference between life and death.

Hubbard and Ergenbright are Special Forces officers, and they accept the risks to themselves for the service they have committed to on behalf of their country. What they don’t accept, however, is the extraordinary tragedy of mass shootings that take innocent lives in schools, public spaces and even military bases far too often across the United States and abroad.

Upon entering the NPS Department of Defense Analysis program, Ergenbright and Hubbard wanted to apply their own special operations expertise and background to this devastating problem. The result was a detailed thesis that quickly realized that one of the most critical factors in limiting the loss of life is time. “The rate of kill is tied to incident duration. As we were thinking about the problem, we determined if you can affect either incident duration or response time, you can effectively mitigate the affects of an active shooter and reduce the rate of kill,” explained Ergenbright.

“Really what we found as a missing variable was the lack of a victim initiated mitigation system, which we liken to a fire alarm. The fire alarm has a standardized operation, and there is a standardized understanding of what is coming,” he continued.

The VIM system includes several components beyond an alarm. It is a system of emergency call boxes in all public areas of the campus; electromagnetic door locks linked to the call boxes; a mobile situational awareness device capable of linking directly to the call boxes; key fob and proxy access for first responders to all buildings on campus; and a remotely-located manned Incident Command Center (ICC) from which the full system and appropriate safety protocols can be managed.

The goal of the VIM system is many-fold. It would allow two-way communication for victims, ICC personnel and emergency responders to provide more specific and timely tactical information. The system can also promptly lock down the campus in specific zones, or as a whole, based on tactical information, improving the chances of isolating the shooter and improving law enforcement response time. The system would also notify students, staff and faculty of an emergency with pre-programmed notification via “any networked media device” such as a cell, tablet or computer.

“Students Complete JPME in Joint NPS, Naval War College Program

By Amanda D. Stein

IN 1986, AFTER a series of snafus in joint military operations, the Goldwater-Nichols Department of Defense Reorganization Act implemented sweeping changes across the defense department. Among them was a greater emphasis on preparing Soldiers, Sailors, Airmen and Marines to operate side-by-side, seamlessly, in times of peace and war.

Today, joint operations are commonplace, and the men and women of the armed forces are well prepared to work alongside one another, in part because of joint operations education like the Navy’s Command and Staff program which includes Joint Professional Military Education (JPME) Phase I credit.

Courses with JPME credit are just one way in which the DOD prepares officers for joint assignments by exposing students to operational and decision-making processes that will make them effective working with other services. The two-phase program traditionally requires students to attend courses at the Naval War College (NWC) in Newport, R.I., or fulfill them through distance learning outside of their day-to-day duty assignments.

But a long-standing partnership between NPS and NWC allows students to function, from the student standpoint, as much as like any other NPS degree requirements proved to be ideal for me,” said Lt. Cmdr. Angela Lefler, a meteorology student scheduled to graduate in March. “It makes sense to knock it out while we, as students, have some control over our schedule and can actually get several things accomplished simultaneously. I’m glad I did it while I was at NPS, and that’s the advice I give to all incoming students in my program.”

Since 1999, the Naval Postgraduate School has partnered with the NWC’s Monterey office, located on the NPS campus, to allow students to complete the four courses that comprise the NWC Command and Staff (C&S) program in conjunction with students’ degree programs. NWC Monterey Chairman Fred Drake explains that in addition to saving students the time they would normally set aside exclusively for JPME studies, doing the program during their time at NPS gives real-world context to their studies.

“One real advantage for the officers who complete their JPME Phase I here is that while they are going through our War College courses, they are going through their NPS degree program, which really ties the relevance of their NPS degree into the DOD environment,” said Drake.

“We try to work with the other departments to provide the least amount of interference, and give both organizations a chance to optimize their resources here on the Monterey campus,” said Drake. “We try to function, from the student standpoint, as much as like any other NPS department as possible, while fulfilling Naval War College requirements here on the West Coast.”

All U.S. military officers and senior DOD civilian employees are eligible to take the NWC courses at NPS. Navy, Marine Corps and Army officers can use their NWC C&S diploma to fulfill their service’s intermediate level service college ME requirements. Since the program’s inception in 1999, more than 3,000 officers have completed Joint Professional Military Education Phase I certification through the partnership while concurrently completing their NPS degrees.
NPS, NATO Partner to Build Transparency, Efficiency in Defense Institutions

By Kenneth A. Stewart

AS THE U.S. Partnership for Peace Training and Education Center (USPTC), the Naval Postgraduate School and its Defense Resources Management Institute, are playing a pivotal role in partnering with NATO on the Building Integrity (BI) program. The BI effort, established in 2007, seeks to empower developing nations across the world with the skills, knowledge and tools to build efficient, corruption-free defense institutions.

The latest major development in the BI effort brought an international contingent of diplomats and senior government officials from nations across the globe for the “Building Integrity” conference in NPS’ hometown of Monterey, Calif., Feb. 23–28.

Opening the conference was NPS Interim President Rear Adm. Ian E. Tighe, welcoming the 180 representatives from 35 NATO member and allied nations.

“The guiding principles of the Building Integrity initiative are critical to developing worldwide global security, and I am very proud to have our own institution partnering with you in standing up to these challenges,” she said. “Throughout our institution, some of the brightest minds in their respective fields dedicate their professional careers to teaching military officers about these very values.”

NATO Supreme Allied Commander Transformation Gen. Jean-Paul Paloméros served as the opening keynote speaker, encouraging conference attendees to take advantage of the critical opportunity the BI conference provides.

He spoke at length about the initiative’s role in encouraging sound institutions, particularly in places like Afghanistan where NATO representatives have been working for more than a decade to encourage good governance in both civilian and military sectors.

Paloméros noted NATO’s contributions to anti-corruption measures, historically, and specifically pointed out efforts to combat corruption in the Afghan National Security Forces (ANSF). This year’s conference had an entire program tailored to reducing the risk of corruption in the ANSF, and he graciously acknowledged the Afghan representative to the conference, H.E. Ambassador Homayoun Tandar, of the Embassy and Mission of Afghanistan in Brussels, as well as NATO’s enduring commitment to the nation and its dedication to rooting out corruption as it transitions toward democracy after 30 years of conflict.

The Building Integrity program was initiated to increase transparency, improve accountability and enhance integrity in the defense and security communities. The focus of the effort is perfectly tailored to the intellectual capital in NPS’ Defense Resources Management Institute, or DRMI.

Dr. Francois Melesse, DRMI Director, has been instrumental in bringing the conference to the Monterey Peninsula, and notes the institute is well positioned to impact the program.

“This is the U.S. contribution to NATO’s Building Integrity Program,” said Melesse. “(DRMI) encourages transparency, fiscal management and decision making. The idea is to increase transparency through financial management and fiscal tools. If you invest in increasing transparency, you increase detection which increases the probability of detection.”

Our own Defense Resources Management Institute was created with the mission of developing efficient and effective resource management practices in defense organizations,” added Tighe. “After nearly 50 years, the institute has touched every corner of the globe, providing sound robust techniques built upon traditional management theory and economic reasoning that are the modern day building blocks of complex decision theory.

Conference organizers stress that investments made in transparency, integrity building and accountability can lead to greater public confidence in military institutions and reduced corruption.

“The Building Integrity program is part of NATO’s commitment to strengthening good governance in the defense and security sectors,” said Ambassador Dirk Bengelmann, NATO Assistant Secretary General for Political Affairs and Security Policy. “Making effective use of resources in the defense and security sector is a challenge faced by all nations.”

This is the second Building Integrity Conference to be hosted in Monterey. The conference is conducted bimannually and is open to military and civilian officials from NATO nations, allies and partners including Partnership for Peace, Mediterranean Dialogue and the Istanbul Cooperation Initiative.

For more, visit: www.nps.edu

For most, setting foot on a desolate Antarctic glacier would be a once-in-a-lifetime opportunity. And with its bone-chilling winds and uncomfortably low temperatures, once in a lifetime might be just enough.

But for a team of NPS researchers, a second chance to spend two months on a desolate ice sheet was a welcomed adventure. And this year, unlike the last, is yielding previously unseen data on one of the Western Antarctic Ice Sheet’s (WAIS) most rapidly melting glaciers. The NPS group included Research Professor of Oceanography Tim Stanton, Research Assistant Professor of Oceanography Bill Shaw and Oceanographer Jim Stockel.

“These are three unique things about the Western Antarctic Ice Shelf,” explained Stanton. “We know from satellite observations that the WAIS is moving and thinning very rapidly compared with other ice sheets. A huge amount of fresh water is being lost from that system every year. That ice goes into the ocean, and is constrained by this narrow portal at the top part of Pine Island Ice Shelf, which is a choke point for the ice streams up on the continent.

Because a lot more ocean heat is getting in under the ice shelf and melting it more rapidly, it is lifting up the ice shelf, letting that water go in even further, resulting in the grounding line lifting up even more,” he continued. “So that’s an unstable process. And as you lift it up, you reduce the drag on the ice shelf. The ice is melting more rapidly, making it more buoyant and less sticky to the seabed. That’s allowing the ice to flow more quickly down from the ice sheet.”

NPS researchers have been preparing for the opportunity to deploy a series of specially-designed instruments on the Pine Island Glacier (PIG), which will monitor temperature and salinity, among other data.

After severe weather last year gave the team only two days on PIG to frantically do what research they could, this year’s trip proved to be much more successful, with six full weeks on the ground to deploy instruments and gather data.

“Our boots were on the ground, our whole team of 12 people knew exactly what to do. And we made great time. We actually got all of the work done,” explained Stanton. Each group had a specific goal for measuring the PIG ice shelf structure and melting rates, with the NPS team using gear they designed based on decades of combined experience and field research. After drilling two holes into the 500-meter thick ice shelf at three separate sites, two different instruments were deployed—the Ocean Flux Profiler and the Fixed-Depth Ocean Flux Package. Each will continue to gather and transmit data on ocean salinity, temperature and currents back to researchers at NPS.

The parameters for data collection can be changed remotely as needed, to respond to changing environmental conditions and system power limitations. If all goes well with the support structures positioned above the ice, the team expects the sensor packages will continue to transmit data for the next year or two.

The team hopes that the research will help open doors for further understanding of glacial systems and the impact of climate change upon them.

“Hopefully, new insights into the physics of ocean-ice interaction will lead to a better overall understanding of how the Earth’s ice sheets are responding to climate change,” said Shaw. “This will then allow the science community to make better predictions on important issues such as how fast sea level will rise in the coming decades.”

NPS Research Team Sees Success in Return to Pine Island Glacier

By Amanda D. Stein

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NASAL POSTGRADUATE SCHOOL

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University Says Farewell to Winter Quarter Graduates

By Kenneth A. Stewart

THE NAVAL POSTGRADUATE SCHOOL honored 366 students earning 367 advanced graduate degrees during NPS’ Winter Graduation Ceremony in King Auditorium, March 29.

Presiding over the ceremony was NPS alumnus and Interim President, Rear Adm. Jan E. Tighe. Tighe welcomed graduates and their families and acknowledged the recent work of faculty and staff.

“This institution serves the national security community through advanced graduate education and real-world research — you make that mission a success,” said Tighe. “These last four months with you have only reinforced my belief that NPS will remain a vital element in the success of our Navy, our sister services, and our national and international security partners.”

Tighe also recognized the assembled graduates and their families. “You should be justly proud of what you have accomplished here. We are proud of you,” she said. “Your experiences and education have prepared you to become leaders who are at the forefront of resolving the security challenges of your service, nation and the global community.”

Tighe’s remarks were followed by those of former U.S. Atlantic Fleet Commander, retired Adm. Henry H. Mauz Jr., who also recognized the contribution made by NPS’ world-class faculty.

“This faculty has taken years to build … The depth and breath of our faculty is absolutely outstanding and nationally recognized,” said Mauz.

Mauz spoke of the commitment shared by faculty members who often work long hours with little pay and without the benefit of teaching assistants.

“Why do they do it?” asked Mauz. “They do it because they are dedicated and patriotic and because of these students. It’s a joy to work with our students.”

Mauz also thanked the graduating class for their commitment to a “heroic profession.” He encouraged graduates to continue to seek self-improvement, to take care of their subordinates, and to be bold as they executed their duties.

“Go forth and slay dragons!” he stated emphatically as he closed his address to the graduating class. \n
Distinguished Professor Emeritus Dr. Allen Fuhs is not an astronaut. But in some sense, he has reached the stars.

On May 8, at the American Institute of Aeronautics and Astronautics (AIAA) Spotlight Awards Gala in Washington, D.C., Fuhs will officially become an AIAA Honorary Fellow, joining the likes of Neil Armstrong, Orville Wright, and many other pioneers of the profession. He is the first AIAA Honorary Fellow from the NPS faculty ranks.

Fuhs proudly admits he was always fascinated with aeronautics, in spite of his advisers encouraging him to focus his engineering prowess elsewhere (he joined the profession before even NASA was created).

Fortunately for NPS, he followed his heart and would go on to leave a remarkable legacy at the university after more than 20 years on campus. Following stints as chairman of both the aeronautics and mechanical engineering departments, Fuhs created the Space Systems Academic Group (SSAG) in 1981, designing a curriculum tailor-made to the unique needs of the Navy’s operations in space.

Thirty years later, today’s SSAG serves as a hub for defense-focused space studies, bringing together faculty from across disciplines to provide students in the Space Systems Engineering and Space Systems Operations curricula with a one-of-a-kind, relevant education and research experience.

His many accolades include being a past president of AIAA, an inductee into the International Space Hall of Fame, and so many others. But ultimately Fuhs is a teacher at heart, supervising more than 100 master and doctoral theses over his career at NPS with a knack for explaining the complex in understandable terms.

So how would such an accomplished professional describe becoming an AIAA Honorary Fellow, the latest in a career of prestigious honors? He notes, it is simply “the red cherry on top of the whipped cream of a hot fudge sundae.”