



NAVAL  
POSTGRADUATE  
SCHOOL

IN REVIEW  
OCTOBER 2006

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Mobile Radar  
*New testbed for tactical military systems*



Alumnus Phones Home  
*During orbit aboard International Space Station*



SECNAV Names Provost  
*Electrical and computer engineering expert selected*



## PRESIDENT'S MESSAGE



*NPS Acting President Air Force Col. David Smarsh (right) orients new Air Force students in Herrmann Hall.*

The NPS student body is growing and rapidly adapting to meet the challenges of fourth-generation warfare.

The number of Air Force and Army students has surged, and the overall in-residence student body has grown to almost 1,800, with an additional 937 students enrolled in distributed learning courses.

The increased Air Force presence is due to a boost in Air Force quotas as well as an increase in officers who select NPS under AFIT's Intermediate Development Education Program.

In our last two quarters, the number of Army students has also seen its greatest increase ever.

In August, NPS underscored its commitment to educate the total force anytime, anywhere by holding the first annual Distributed Learning Summit.

FY06 also saw NPS selected as DoD's executive agent for the new Science, Mathematics and Research for Transformation program, SMART, a civilian scholarship-for-service program critical to the U.S. maintaining its scientific and technological edge.

As the nation's premiere defense research university, we continue to open new frontiers and develop new technologies to enhance national capabilities.

- Air Force Col. David Smarsh  
NPS Acting President

# IN REVIEW

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U.S. Navy photo

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# SECRETARY OF THE NAVY APPOINTS NEW PROVOST

By John Sanders

Secretary of the Navy Donald C. Winter has appointed Dr. Leonard Ferrari as the Naval Postgraduate School's 12th provost and chief academic officer.

Ferrari, who has served as the NPS associate provost and dean of research since 2003, is an electrical and computer engineer with a Ph.D. from the University of California-Irvine, a master's degree from Northeastern University and a bachelor's degree from the Massachusetts Institute of Technology.



Dr. Leonard Ferrari

He was selected for the NPS post following a nationwide search. His most notable work has been in the fields of signal and image processing, medical imaging systems, computer graphics and multimedia systems. He created an extremely efficient method called the 2-5-2 spline for computer graphics and data compression that provided unique computational advantages over previous methods. Ferrari has published more than 100 research articles and has more than

30 years of experience in academe and industry. Prior to joining NPS as the dean of research, he was special assistant to the secretary of technology, Commonwealth of Virginia, and vice provost for special initiatives for Virginia Polytechnic Institute & State University (VT). He has also been the department head of the electrical and computer engineering department at VT as well as the University of California-Irvine.

Under his leadership as NPS dean of research, faculty reimbursable research programs have continued to grow. NPS has also established new partnerships with other universities and government labs, including the University of California-Santa Barbara, Virginia Tech, National University of Singapore and Lawrence Livermore National Laboratory. 

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# OPERATIONS RESEARCH EXPERT WINS PRESTIGIOUS HAMMING AWARD

By Barbara Honegger

Associate Prof. Robert "Rob" Dell of the Naval Postgraduate School's No. 1 ranked Operations Research (OR) Department received the prestigious Richard W. Hamming Teaching Award at a ceremony at the university, Sept. 12. The department was named top in the nation in the latest survey by Interfaces, one of the two main journals of the Institute for Operations Research and the Management Sciences.

The honor, named after the computer science pioneer and world-renowned inventor of the "Hamming code," recognizes the NPS faculty member who has most excelled in classroom teaching as evidenced by students' mastery of course material, thesis supervision and mentoring, and student education beyond the classroom. Hamming was an NPS professor emeritus until his death in early 1998.

A committee chaired by Prof. Monique Fargues received inputs from a broad

cross section of NPS leadership, faculty, students and staff before making its recommendation to acting NPS President Air Force Col. David Smarsh, who made the final selection.

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*"He's an incredible thesis adviser who gives you the big picture as well as attention to detail that rivals that of the finest surgeon."*

- Lt. Cmdr. Arvis Owens

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"Like anything else in life, teaching is hard work and takes a lot of preparation," said Dell. "You have to devote yourself to it, and to do that, you need to really care whether your students learn what you are trying to teach them. I truly enjoy interacting with students in the classroom, breaking down topics into pieces that

enable them to 'get it' where they would otherwise struggle, and giving them the opportunity for genuinely independent thought. When I learned I'd been selected, I remembered having met Professor Hamming here at NPS. I feel honored to have been able to shake the hand of someone who made such fundamental contributions to a field so important to my own work."

"Professor Dell's diverse contributions exemplify the spirit of the Hamming Teaching Award," the selection committee wrote in making its nomination. "He is known as a truly dedicated teacher who guides and motivates his students to master the skills they need to expand their knowledge in the future... His teaching is closely interleaved with his research and grounded in real and current military problems."

"As a teacher and thesis adviser Professor Dell is awesome," said Lt. Cmdr. Jason Bridges, who himself won the Chief of Naval Operations Award for Excellence

in Operations Research and the Military Operations Research Society Stephen A. Tisdale Graduate Research Award at the ceremony. “He has a passion for teaching, is a pleasure to work with, and a perfect example of why the NPS OR Department is top ranked in the country. And he takes the time to give homework assignments, and to grade them with individualized feedback, for each of his students on a daily basis.”

“Daily homework lets me clearly see what students are struggling with, both individually and as a group, and if there’s a common difficulty, I address it at the beginning of the next day’s class,” Dell stressed. “To be successful as a teacher, every time you teach a course, you need to teach it differently, and that requires constant feedback.”

“Writing the recommendation for Professor Dell’s nomination was easy,” said another thesis student, Lt. Cmdr. Arvis Owens. “He’s an incredible thesis adviser who gives you the big picture as well as attention to detail that rivals that of the finest surgeon. And he frames every problem in a practical, realistic way that reinforces the concepts he’s trying to get across.”

Bridges’ and Owens’ theses are on intra-theater airlift planning, a specialty of Dell’s, whose Ph.D. thesis addressed the routing of overnight carriers. They are among 100 students for whom he has served as thesis adviser, co-adviser or second reader.

Along with in-residence teaching duties and thesis advising, Dell also oversees academic planning for 133 students as NPS academic associate for operations analysis and chairs the OR Department’s Ph.D. committee. He taught the PD-21 program systems optimization course via video tele-education for five years.

“In addition to being at the top of his game in all professional areas, Rob has a long series of contributions outside the classroom,” said Prof. Jim Eagle, chair of the NPS Operations Research Department.

“Most striking has been his almost instant reachback to the Iraq theater in response to a former student’s call for help to solve an urgent operational problem.”

Eagle noted that, in addition to the NPS Operations Research Department being ranked No. 1 in faculty contributions to the OR practice literature, the INFORMS journal *Interfaces* also noted that, “Over the five rankings (since the survey began), some schools have been consistent performers. Four schools have always been in the top 10: the Massachusetts Institute of Technology, the Naval Postgraduate School, Stanford University and Temple University.”

“Professor Dell cares about where you are, not only academically, but personally,” said Owens. “The last time I was in his office, we went over the previous week’s thesis guidance, and then he shared his wisdom of years on how best to buy a house.”

“Not only is Professor Dell’s performance in the classroom exemplary,” the award citation notes, “but he also set himself apart as a master teacher by publishing a paper in an education journal to help advance the state of the art.”

The article mentioned is “Formulating Linear and Integer Linear Programs: A Rogues’ Gallery,” co-authored by Dell and NPS Distinguished Professor Gerald Brown, which will appear in *INFORMS’ Transactions on Education* later this year.

Dell, whose research and teaching specialization is military applications of optimization theory, has received research

support from all uniformed services for a wide range of optimization contributions, from naval capital planning to logistics and Coast Guard cutter scheduling; and his optimization applications extend beyond the military arena. “Prof. Dell has applied optimization in the private sector, in areas ranging from production scheduling to supply chain design,” Brown explained.

Army Base Realignment and Closure offices have continuously supported Dell’s research. In Oct. 2005, together with NPS Assistant Professor and Military Instructor Army Maj. Paul Lee Ewing, he received the prestigious Dr. Wilbur B. Payne Memorial Award for Excellence in Analysis for exceptional analytical contributions to the 2005 Army Base Realignment and Closure (BRAC) process. BRAC commissioners made special mention of the outstanding rigor and quality of the Army’s analysis.

Dell has also received the Department of the Navy Superior Civilian Service Award, the NPS Wayne E. Meyer Award for



Associate Prof. Rob Dell receives Hamming Award from Air Force Col. David Smarsh.

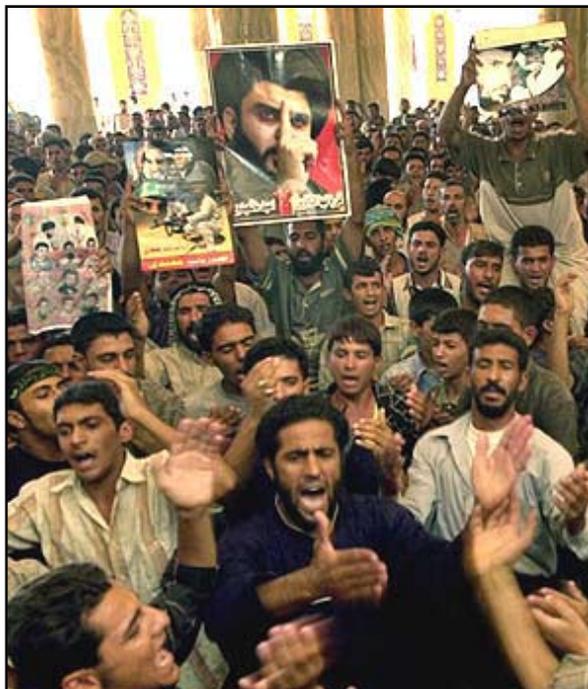
Teaching Excellence in Systems Engineering in 2004; the NPS Operations Research Department Outstanding Research Achievement Award in 2002; and the NPS Operations Research Department Instructional Recognition Award in 1995. 🏆

## PROFESSOR BRIEFS COMMANDER-IN-CHIEF ON MIDDLE EAST ISSUES

By John Sanders

It's not every day that a university professor is called to the Pentagon to discuss foreign affairs with the President, Vice President, Secretary of Defense, Secretary of State, Chairman of the Joint Chiefs of Staff and other senior members of the U.S. national security team.

But that is exactly what happened in August when Prof. Vali Nasr met with President George W. Bush. "He was very engaged and asked many questions," Nasr said. "I gave him a 'lay of the land' perspective on the Middle East and Islam."



Nasr is the author of the recent book *The Shia Revival: How Conflicts within Islam will Shape the Future*.

He joined the NPS faculty in 1993 and teaches courses on comparative politics, international political economy, South Asia, Iran and political Islam. He has written several notable books and his works have been translated into Arabic, Indonesian, Turkish, Persian, Chinese, and Urdu.

Nasr earned his Ph.D. from the Massachusetts Institute of Technology, a master's degree of law and diplomacy from the Fletcher School at Tufts University as well as a bachelor's degree from Tufts. 🇺🇸

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## KHAAN QUEST: A CURRICULUM FOR PEACEKEEPERS

By John Sanders

For most Americans, the storied land of Ghinggis Khan -- today's Republic of Mongolia -- is a distant world away in the high steppes of Northern Asia. For the School of International Graduate Studies (SIGS) Prof. John Feeley, Mongolia has become a close friend.

Feeley is one of the pioneering SIGS faculty members in the Center for Civil Military Relations (CCMR) who has taken defense graduate education on the road and into the operational theater. He and other Naval Postgraduate School faculty have formed mobile education teams that have delivered specialized programs in 66 countries in the last year alone.

He has traveled to Mongolia several times since 2001, and the U.S. assistance has already helped this landlocked nation strengthen its self-defense programs and transform its military. "I'm very proud of this," Feeley said, "because we were in Mongolia long before others. We took our last 10 years of knowledge of stability operations and integrated it into this exercise. This was big!"

The friendships forged during the mobile educational team visits have built trust and cooperation, and have supported Mongolia's increased participation in international peacekeeping missions. In August, Feeley and 15 other CCMR experts provided teaching curricula for Khaan Quest 2006, a 22-nation peacekeeping

exercise sponsored by U.S. Pacific Command with the U.S. Army Pacific serving as the executive agent. Other members of the team included retired Army Lt. Gen. Thomas M. Montgomery, who was commander of U.S. Forces Somalia and deputy U.N. Force commander at the time of "Blackhawk Down," and former U.S. Ambassador David L. Lyon.

The curriculum was developed to educate and train the educators and trainers. "We developed a system for measuring and sustaining the peacekeeping training process. Peacekeeping operations are one of the toughest military missions you can get," Feeley observed. "You need better trained personnel, more discipline, and better command and control. General Montgomery's past experience brought a reality to the whole system as a mentor to the Mongolian colonels and generals who were playing the role of commanding this U.N. operation."

"This was the Pacific Command's Global Peace Operations Initiative Capstone exercise," Feeley said. Held in the Mongolian capital of Ulan Bataar and the Five Hills Training Center about 25 miles away, Khaan Quest involved over 1,200 personnel from the 22 participating nations.

Quoting Dag Hammarskjold, U.N. Secretary General from 1953-1961, Feeley noted that "Peacekeeping is not a soldier's job, but only a soldier can do it."

“The scenarios and teaching curricula in Khaan Quest introduced challenges such as monitoring and controlling a buffer zone, separation of opposing parties, contribution to the maintenance of law and order, and the necessary protection and security for the conduct of humanitarian assistance,” he said.

“When you are probably the only organized force around for a while, who takes care of refugees? Who takes care of displaced persons? Who takes care of a refugee camp where cholera is breaking out? The most important lesson of these exercises is that you’ve got to use every resource you have on the ground to accomplish the mission,” Feeley continued, “and be careful about going outside the box because it can cause the situation to become even worse.

“There are rules of engagement, agreed upon limits to what a U.N. mission is. When you send volunteers in to provide stability, they’re coming in with specific instructions of what they can and cannot do,” he added, “yet the military are in the middle of a highly charged environment, both on the ground and within the U.N.”

Scenarios were realistic but the unfolding crisis in Lebanon heightened everyone’s understanding of the challenges of a multinational peacekeeping mission. “When U.N. Security Council



*A peacekeeper assists children in a refugee camp during the Khaan Quest 2006 exercise.*

Resolution 1701 regarding Lebanon came out, we were able to hand that out to the participants who were all very interested,” Feeley explained. “We discussed questions such as, what would it mean if we were all called up as a group?”

The goal of the Global Peace Operations Initiative is to qualify 75,000 new peacekeepers from around the world by 2010, with 15,000 from countries within Pacific Command’s area of responsibility. Two more multinational peacekeeping exercises will be conducted in the Pacific theater, the next in 2007 followed by one in 2008.

Yes, Mongolia and Monterey are many miles apart. But that distance has been diminished dramatically by NPS military education and security cooperation programs. 🇺🇸





# INFO CHESS

## STUDENTS BATTLE IN UNCONVENTIONAL CHESS GAME

By John Sanders

When grandmasters Bobby Fischer and Boris Spassky met for the World Chess Championship at the height of the Cold War in 1972, the two squared off in front of an open game board with 16 chess pieces each. Televised worldwide, the duel subsequently became known as the Match of the Century.

But how would this strategy board game play out if many of the knowns became unknowns, including pieces that cannot be seen by the opponent? What if a player had less than 16 pieces and the heavy pieces (kings, rooks, knights, bishops) could be placed on any square within the starting rows? What if psychological operations and electronic warfare attacks became a part of the game? How would strategy change?

During the past quarter, students in the Defense Analysis Department course *Militaries and Technological Change* discovered the differences first hand in a team board game that includes invisible pieces and terror-war subtleties of attack and defense. The game: Info Chess.

Students were divided into eight teams, each with six players. The single-elimination competition began in early September and the finals were played out on Sept. 15.

Indian Army Col. Ravindran Rajan, whose team lost during the quarterfinals, served as timekeeper for the championship match. As Prof. John Arquilla, who developed the course and integrated the game into the syllabus, walked from room to room to relay the latest board move, Rajan remarked on the play and the process, "I am able to explain the whole thing with coherence, but there are six of them sitting in the room debating the next move..." His voice trails, his arms and eyebrows raise, and it

is clear that team members often have different opinions about strategy.

"Most Americans think of moving their heavy pieces," Arquilla notes. The teams build their strategy and select their pieces (or force structure) throughout the quarter. Lighter, more nimble "forces" have more pawns and heavier forces have fewer pieces overall because of the higher investment price of the knights, rooks and bishops. As the teams develop their force structure and information operations plans, they maintain secrecy of their forces and game strategy.

"Info chess is currently played at the service academies," Arquilla remarks, "but the tailored version in use at NPS is unique, designed to encourage not only what sort of force to build, but what concepts of operations to employ."

Four of the eight teams built identical force structures, two were somewhat lighter, one was very light and one more reliant on heavy forces. According to Arquilla, "The two finalist teams both had balanced forces, but employed them in strikingly different ways."

The Cold War, with its emphasis on nuclear deterrence and conventional combat campaigns, is now a part of military and world history. The symbology of the superpower standoff in the Fischer-Spassky match has faded. Today's national security challenges – and those of the near future – are and will continue to be more complex. Info chess may only be a board game, but it's a game loaded with insight for today's officer engaged in asymmetric warfare, counterinsurgency, and counterterrorism operations. 

## NOTABLE CONFERENCES

Many NPS partners utilize the university's conference facilities for defense-focused scientific, engineering and foreign policy meetings.

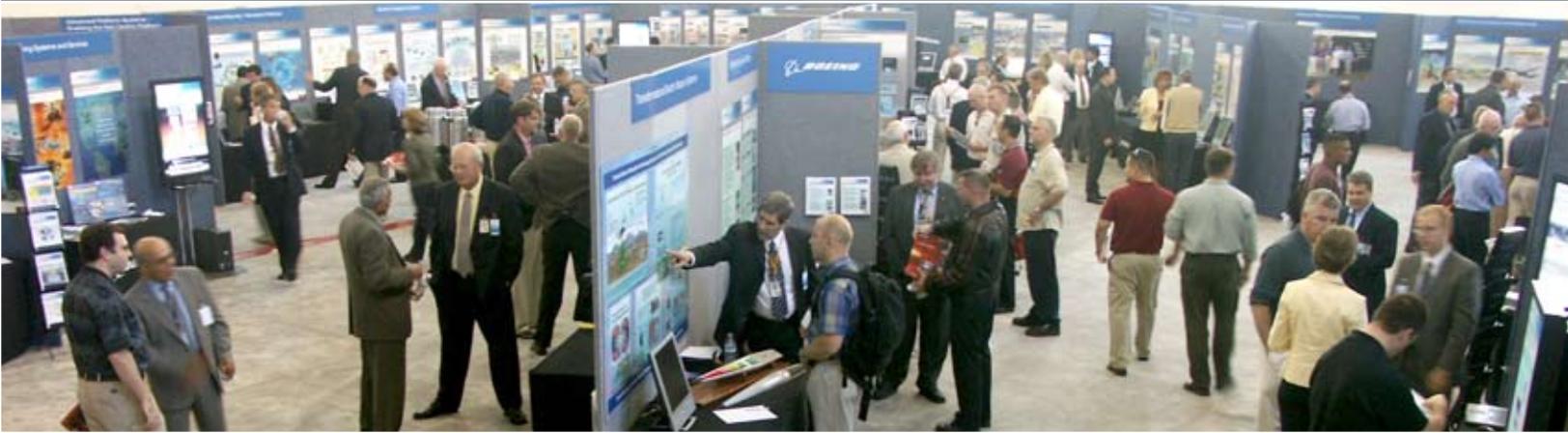
In August, U.S. Pacific Fleet Vice Adm. Terrance T. Etnyre, Commander, Naval Surface Force (top), was a keynote speaker for the Surface Navy Association, while Boeing Phantom Works held a Tech Expo to present emerging new technologies for students and faculty (bottom).

U.S. Marine Corps Capt. Kelly George and Army Capt. Steve Mosley (center) test a circuit board design in the space systems lab in between sessions of the first Naval Space Cadre Educational and Training Summit held in July.

Other recent conferences include:

- Military Defense Intelligence Community Interchange
- Joint Classified Warheads and Ballistics
- Multi Sensing Symposia Special Group on Active Electro-Optics.

To plan your event, contact us at:  
Telephone: 831-656-2426 (DSN 756)  
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## AIR FORCE SECRETARY KEYNOTE AT SEPTEMBER GRADUATION

By Barbara Honegger

Three hundred and three Naval Postgraduate School advanced degree candidates tossed their tassels following a rousing keynote address by Secretary of the Air Force Michael W. Wynne at commencement ceremonies, Sept. 22 in King Hall.

Crossing the stage were 110 Navy, 41 Marine Corps, 48 Air Force, seven Army, four Coast Guard, and 25 U.S. Naval Reserves officers, as well as 89 Department of Defense civilians and 33 international students from 12 countries. An additional 53 students received their degrees in absentia. Degrees awarded included 237 master of science, 62 master of arts, ten master of business, 55 executive master of business, three Ph.D.s, four electrical engineer and 15 dual.

Wynne began by thanking NPS acting President and Chief of Staff Col. David Smarsh for his outstanding service to the school. "Col. Smarsh brings great credit on the U.S. Air Force and the Naval Postgraduate School by the smashing job he's doing in both positions," he said, and then turned to the master's and doctoral



Graduates march into King Hall Auditorium to receive their diplomas.

candidates gathered in dress uniform.

"The rigor and depth of your study and efforts were great," Wynne told the graduates. "You have participated in one of the most difficult programs we can provide, because we need you to be the most creative and the most ready when you return to the force, the fleet and the field, because we in the defense community are changing. We need you to be able to fight in all five domains – ground, air, maritime, space and cyberspace – and to fuse them into a new spherical situational awareness.

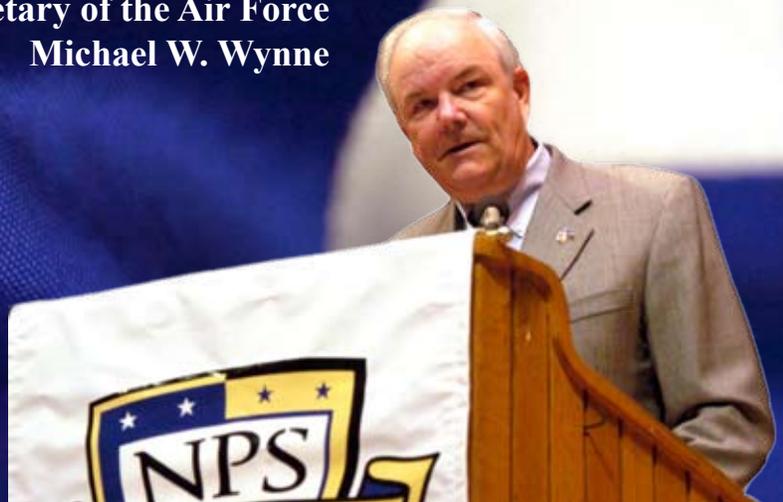
We continue to demand innovation from our leadership and from our coalition partners and so need you to push us at the top. We're looking for change, and we listen well. Go forth armed with the power of the human mind. We welcome you back. We need your knowledge, your talent and your competence."

Prior to his appointment as Air Force secretary, Wynne served as under secretary of defense for acquisition, technology and logistics. 🇺🇸

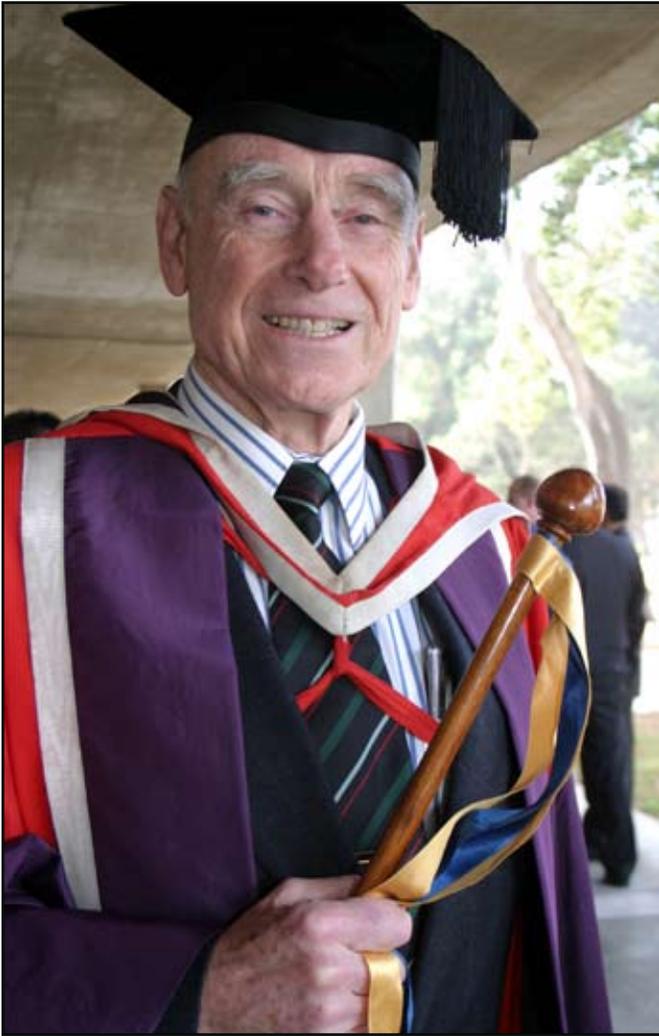


*"Go forth armed with the power of the human mind"*

**-Secretary of the Air Force  
Michael W. Wynne**



## 49-YEAR NPS LEGEND ALF COOPER STAGES UPBEAT “RETIREMENT”



*Graduation day belonged to physics Prof. Alfred “Alf” Cooper, just entering his 50th year as a faculty member, who led the colorful procession for the final time after 33 continuous years of service as ceremonial grand marshal.*

**By Barbara Honegger**

Physics Prof. Alfred “Alf” Cooper, the longest serving faculty member in the university’s history, was presented with the Navy Superior Civilian Service Award at his “retirement” ceremony, Sept. 29. Cooper’s half century of research, teaching and sportsmanship while always remaining the perfect gentleman have made him a living legend to faculty, friends and colleagues at NPS.

“Retirement” is in quotes because, as Cooper quickly points out, “I want everyone to know I’m not going anywhere. I will be a very active professor emeritus.”

Cooper has served the Navy and Department of Defense through 20 NPS superin-

tendents and presidents. He has mentored 145 master’s and 14 doctoral students, many of whom achieved flag rank; served three times as chairman of the NPS faculty council and 13 years on the university’s faculty executive board; and led 176 graduation processions over 33 continuous years as grand marshal, and another 11 years as marshal, at commencement ceremonies.

“Alf Cooper has been a mainstay of the Physics Department and NPS for a half century, nearly its entire history in Monterey,” said department chairman Prof. James Luscombe. “From vacuum tubes and plasma physics, to high-power lasers and infrared systems, his career has mirrored the development of technologies of interest to the Navy in the second half of the 20th century. Before research even became

part of the basic mission of the School, he developed close ties with all branches of the Department of Defense, for years maintained one of the largest sponsored programs at NPS, and has been instrumental in bringing important technologies into the physics curricula.”

Cooper took delight in having a captive audience, taking them on a philosophical ride through what he called his “exercise in serendipity.”

“Life is a ray-tracing program,” he said, as a true natural philosopher, which

he pointed out physics used to be called. “We divide it up in time steps and assume everything will go on the same way, forever, but that’s not true. And when we get to the edge of the next phase, we adapt the principles we know to make decisions on how to move ahead.

“My program was initialized in 1932. That was the year the electron and positron were discovered in Rutherford’s lab, and also the year I was conceived by my parents. In 1951, the year Rutherford’s student Walton received the Nobel Prize for the first artificial nuclear disintegration, I entered the Dublin University physics department, then headed by Walton. On graduation, he called me into his office and said, ‘If you can let the journals pile up on your desk until they fall off into the waste basket, you’ll have what it takes to make it in an academic career,’ and offered me a position in Belfast as a research assistant to work on my doctorate.

“There, I met and worked with Professor Norman Olsen of NPS, who was on a year’s sabbatical. It wasn’t long before he wrote, ‘We have an opening for an assistant professor at NPS. Would you like to come?’ And I said yes. When I arrived in New Jersey and got to New York, and took a bus all the way across the country, and arrived at NPS, (Professor) Herman Medwin said, ‘I’m so glad to see you. Class begins tomorrow at 9:00.’ And ever since, I’ve never had enough time to prepare for a course.” 📖



*Prof. Alf Cooper is joined by fellow retired NPS colleagues following his retirement. (Left to right) physics Prof. O.B. Wilson, Mine Warfare Chair Adm. Richard Williams, Cooper; physics professors Kai Woehler, Fred Schwirtzke and Harry Handler.*



# BUILDING A BALANCED FORCE

Adm. Michael Mullen, CNO and an alumnus of the NPS operations research program, stated in a *Proceedings* article earlier this year: “Perhaps no other challenge is as daunting right now for the Navy as that of defining future force structure, and then building to it.”

NPS continually strives to meet the evolving needs of the Navy and Marine Corps and increase the effectiveness of joint operations through our education and research programs. The following series of stories highlight recent increases in the enrollment of Air Force and Army officers, continued growth in our global

distributed learning programs, and the introduction of a new program called SMART to bolster the scientific and technological base for civilian scientists and engineers.

The scope and focus of these initiatives will enable the Navy and our nation to develop the balanced force and human capital needed to ensure our national security today and in the years ahead.

- Dr. Julie Filizetti, Associate Provost for Academic Affairs and Institutional Advancement

## NPS EXPANDS GLOBAL REACH THROUGH DISTANCE LEARNING

By **Barbara Honegger**

The Naval Postgraduate School mission to educate the total force anytime, anywhere took on new energy in late August when the university hosted the first annual Distributed Learning (DL) Summit.

The university’s Office of Continuous Learning (OCL), the main summit sponsor, is at the leading edge of this global academic outreach, now serving over 900 non-resident students.

The school’s expanding DL component is supported by nearly \$11 million in annual Navy funding, a robust technical and administrative staff, and three outreach offices in San Diego, Norfolk, and the national capital region. NPS also has a new as-

sistant registrar dedicated solely to non-resident/DL programs. Demographics drives the increased demand for distance learning options. The federal government estimates it will soon need 200,000 new employees, many with advanced degrees, and most graduate students today earn those degrees online or via video tele-education while working full time in demanding jobs.

Even one of the most demanding jobs in the Navy didn’t keep helo pilot and current in-residence Space Systems student Lt. Diallo Wallace from earning an NPS certificate in Information Systems Operations while performing his operational duties at sea.

“The NPS distance learning program allowed me to seamlessly integrate my operational mission with academic career advancement,” Wallace said. “I even took tests on my laptop while in a helo squadron 90 miles off the coast of California, and passed with a 92,” he added with a big smile. “After receiving my wings, I then called NPS instructor Sue Higgins and told her I was willing to be a guinea pig for an online space applications course she was developing. DL is also empowering whether you’re currently in a course or not,” he added. “As a junior officer while in my main ASW mission, I was able to go online and pull current information into my briefs.”

Wallace presented one of two student testimonials at the summit. “I can’t say enough about the benefits of NPS distributed learning and what it’s done for my career,” Wallace told the symposium. “I want to do everything I can to encourage all NPS faculty to make their in-residence courses also into DL courses.”

“His (Diallo’s) career is a perfect example of creatively exploiting DL technologies and the continuum of learning in the fleet to shorten educational timelines and advance one’s career,” said OCL Director Tom Hazard, also a former aviator.

Many other speakers emphasized the same theme -- the technology-enabled convergence of DL and in-residence education



Vice Adm. Patricia Tracey

resulting in a seamless learning continuum. Just as the typewriter was originally invented for the blind but rapidly adopted by the sighted, communications technology invented for DL applications is increasingly used to enhance in-residence courses as well.

“It’s no longer as relevant to talk about resident and non-resident educational technology because the technology for resident and non-resident education is increasingly the same,” said NPS Chief Information Officer Christine Cermak. “Learning management systems, video streaming and archiving, video to the desktop, collaborative technologies and others are all technology tools used for both resident and non-resident academic programs. Some technologies originally deployed in support of distance learning are especially important to resident student populations. For example, international students, for whom English is generally a second language and who comprise nearly 25 percent of on campus NPS enrollment, find it particularly valuable to be able to access video capture of lectures and course content multiple times.”

“Many faculty who do DL come back and say it’s increasingly important for their residence courses as well,” said deputy director of OCL, Val Moule.

“The Office of Continuous Learning is a tremendous resource for NPS faculty who want to teach online and for faculty development. We have robust and effective teams for faculty training in Blackboard and other systems, DL course design and development, tech support and tech innovation, and a research and development incubator for new technology and programs, all for the asking.

Lt. Cmdr. Linda Rouston, a knowledge management officer forward deployed north of Kabul with Joint Task Force 76, gave a second student testimonial by video. “NPS DL prepared me immensely for my mission and enabled me to continue learning on the job,” she said. “I can’t say enough good things about the entire staff of NPS and all that they’ve done for me here.”

Retired Vice Adm. Patricia Tracey, who gave one of two keynote addresses, also focused on convergence of training and education enabled by DL technology.

“DoD is the most powerful training and learning organization in the world, but it’s still on the World War II model, which is hierarchical and with little adaptability,” she said. “The new educational strategy must focus on the operational mission and raise the performance level of the whole organization, not just the top. To achieve this, we need to use emerging technological compe-

tencies to move education a step closer to training, and training a step closer to education.

“NPS is about increasing the educational capability of the total force, and distance learning is the mechanism by which you can have the greatest impact on the greatest need, in an opera-



*Information Systems Lecturer Sue Higgins reviews a DL course assignment with Lt. Diallo Wallace*

tional environment where time at sea is so important,” Tracey said. “How much you develop DL will make a difference in whether the Navy is ready for the 21st century, because more and more your clients are everywhere. This conference matters a lot because DL is also the way you’re going to be able to reach the most influential decision makers. Increasing adaptability in curricular content and delivery methods is an important piece of the Navy’s human capital strategy moving forward. Also, NPS is seen as the expert in how to deliver DoD education. If you decide a hybrid model, such as the Homeland Security curriculum, is best, you’ll be believed.”

Prof. Dick Doyle, who teaches defense budgeting by asynchronous DL in the Graduate School of Business and Public Policy, gave a faculty “DL adopter” testimonial.

“DL is a great place to be and a challenge, and Tom Hazard and the Office of Continuous Learning are incredibly helpful in making sure I succeed,” he said. Doyle uses Camtasia to create video tours of key web sites for his online courses, special software to capture current data and adds weekly video updates online.

One thing is certain. The NPS Office of Continuous Learning walks its talk. 🗣️

# NPS TO ADMINISTER KEY CIVILIAN SCHOLARSHIP PROGRAM

By Barbara Honegger

The Department of Defense has selected NPS as executive agent for its critical new Science, Mathematics and Research for Transformation (SMART) Defense Scholarship Program. The program's mission is to increase and ensure the number of highly qualified scientists and engineers in the future DoD workforce.

SMART is primarily a graduate education scholarship-for-service program, funding tuition, cost reimbursement and stipend for master and Ph.D. candidates, and some undergraduates, who have been accepted by an accredited college or university in science, engineering or mathematics.

Applicants must be U.S. citizens who are eligible for security clearances. Scholarship recipients obligate one year at a DoD research lab for each funded year in an academic program.

"The stimulus for SMART was the upcoming personnel crisis in the DoD labs," said NPS Deputy Director of Programs Lt. Cmdr. Lynn O'Neil, acting program manager for SMART.

"With baby boomers quickly reaching retirement age, there will soon be a bow wave of retirees across the federal government, including the defense labs. SMART was created to proactively mitigate that intellectual capital short fall."

Keith Thompson, the OSD official who heads the program, directs Science, Technology, Engineering and Mathematical Education and Workforce Development in the Office of the Director for Basic Research, Director of Defense Research and Engineering.

At the Worldwide Human Resources Conference in July, he revealed that DoD

laboratories are expected to lose 13,000 scientists and engineers over the next ten years at the same time that demand for scientists is projected to increase by 17 percent, and engineers by 22 percent.

"Congress considers SMART so important to maintaining the nation's scientific and technological edge that it made the program permanent in the National Defense Authorization Act for 2006," said O'Neil. NPS currently administers about \$8.5 million in program funds, distributed in approximately equal segments to the Navy, Army, Air Force and other DoD agencies.

Prof. Knox Millsaps is the Executive Agent Officer for SMART at NPS, with Capt. Paula Jordanek, Director of Programs, overseeing program operations. Deborah Shifflett is the SMART program manager. 



*SMART cohort members attended their orientation session at NPS on August 10. Members will spend the next year in science, engineering or mathematics programs. Standing with them are NPS Director of Programs Capt. Paula Jordanek (back right), Deputy Director of Programs and acting program manager for SMART Lt. Cmdr. Lynn O'Neil, (third from back right), SMART Executive Agent Officer Prof. Knox Millsaps, (far left) and SMART Program Manager Deborah Shifflett (fifth from back right).*

# ARMY STUDENTS SURGE

By Barbara Honegger

The number of Army students at the Naval Postgraduate School surged from 126 to 178 over the last two quarters thanks to the service's new Expanded Graduate School Program (EGSP). The program is dedicated to increasing the retention of high-potential officers and enhancing the intellectual capital required by a joint and expeditionary force.

In addition to the existing Advanced Civil Schooling (ASC) program for Army specialty track officers, EGSP extends master's and doctoral degree opportunities to Army operational track officers. Of the 200 additional Army officers enrolled in U.S. universities this summer under the program, 45 -- or nearly one quarter -- chose to come to NPS.

EGSP students attend U.S. universities for between 12 and 18 months, earning technical and non-technical master's and doctoral degrees in one of three major categories: cultural awareness/regional area studies; operational skills; and diplomacy, governance and security. EGSP is open to both pre- and post-commissioned officers, who are guaranteed a graduate slot beginning eight to 12 years into their military careers.

"This is a win-win," said Col. William "Bill" Tarantino, assistant professor of Operations Research, associate dean of the NPS Graduate School of Operational and Information Sciences and winner of the 2000 Franz Edelman Award for excellence in operations research. "The Army gets a highly-educated officer corps -- top generals like Eisenhower surrounded themselves with an educated staff -- and the officer gets a world-class, joint, operationally-relevant graduate degree with a wide range of choices for what to specialize in."

"The new EGSP program offers operational officers the best of both worlds," agreed Army Maj. Lee Ewing, a former special forces officer and now assistant professor of operations research at NPS.

"Some of these graduates will go on to be

high-ranking Army operational officers and high-level staff officers in the Pentagon, and now they're going to know about operations research and defense analysis. There's no other operations research (OR) department that offers relevant courses like advanced combat modeling, wargaming and campaign analysis. It's just not taught elsewhere." Ewing holds a Ph.D. in economics and operations research from the Colorado School of Mines, and was a fire-support officer in operations Desert Shield and Desert Storm.

"What the Army values most about NPS is its jointness and the large number of international officers, the wide range of opportunities for operationally relevant research, and world class faculty who are passionate about their research and teaching, many of whom have worked on DoD and Army-relevant research for decades," Tarantino said.

The Army students themselves are equally enthusiastic.

"There are compelling reasons to choose the Naval Postgraduate School as your No. 1 choice for earning an advanced degree," said Lt. Col. Tom Cook, former project leader for the Advanced Ballistic Missile Defense System, Missile Defense Agency.

"I got my master's at NPS in 1999 and

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*"The Expanded Graduate School Program is a win-win for officers and for the Army."*

**- Army Col. Bill Tarantino,  
associate dean, GSOIS**

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came back for my Ph.D. and to become a military instructor because the faculty is world class, with an intimate knowledge of the operational issues faced by both DoD and the Missile Defense Agency."

"NPS' OR Department is the best in the world, ranked No. 1 with the University of



Virginia," said Blackhawk pilot, former Ft. Bragg platoon leader and battalion adjutant Army Capt. Kathryn Pegues, a master's student in operations research.

"OR is a decision tool, and I wanted a degree program that will make me a better decision maker in the Army, because I'm going back to operations. At NPS, when I write my thesis, I get to tackle real-world problems that will affect today's actual Army on the ground."

Army Capt. Hise Gibson, also an OR master's student and Blackhawk helicopter pilot, commanded Alpha Company at Baghdad International Airport in August 2003 in support of Operation Iraqi Freedom I and II for 15 months.

"It's an incredible opportunity to be able to come to NPS and interact with officers from the other services and other countries," he said. "The operations analysis curriculum is extremely intellectually challenging and completely different from anything before in my Army career path."

Defense Analysis student Army Lt. Col. Fred Renzi, a former armor officer now in psychological operations who held armor assignments in Germany, Desert Storm and at Ft. Hood, recently served with Cook in Iraq. While at U.S. Joint Forces Command, he also supported force planning and sustainment for operations Enduring and Iraqi Freedom. "There's no other university where professors can support the complex and militarily relevant thesis I want to do," said Renzi. After graduating from NPS in summer 2007, Renzi will assume command of 6th Psychological Operations Battalion (Airborne).

Army officers are currently 11 percent of NPS' nearly 1,800 resident students. 

# AIR FORCE STUDENT INCREASE SETS RECORD

By Barbara Honegger

Following an historic 2002 memorandum of agreement between the secretaries of the Navy and Air Force forming a new educational alliance between the services, the number of Air Force students at the Naval Postgraduate School has steadily increased.

That surge is due primarily to two factors: a boost in general quota Air Force officers assigned to the school and an increase in the number of majors and some captains who select NPS under the Air Force Institute of Technology's (AFIT) Intermediate Development Education (IDE) Program.

As of October, NPS has 342 in-residence Air Force students enrolled across all four graduate schools, with the largest contingents in the Graduate School of Business and Public Policy MBA program, national security affairs regional studies, special operations, space systems, and meteorology. Of those 342, 331 are master's degree candidates and 11 are working towards their doctoral degrees.

"In the post 9/11 environment, the Air Force made a conscious effort to increase the number of mid-career officers who are culture and language qualified and to really use that as a promotion indicator," said Chief of AFIT NPS Programs Maj. Pamela Dickey.

"All Air Force IDE selectees are top rung," said Air Force Lt. Col. Terry Smith, NPS lecturer and information warfare/electronic warfare program officer. "They're hand selected from a very competitive field when promoted to major."

"I don't know how to aim below the top, and NPS was my No. 1 choice," said Maj. Michael Moyles, an information warfare student whose last assignment was as a communications-information officer at Offutt Air Force Base. "Once I got into in-residence PME (professional military education), which is the hardest cut, the hardest school to get into was NPS. I fought for two and a half years just to get here."



*Air Force 2nd lieutenants read from a textbook at the NPS administration building.*

"The Air Force is really serious about higher education," said Maj. Ryan Craycraft, an F-16 pilot and incoming IDE student in national security affairs. "Two or three years ago, the service added purely academic master's degree programs to Professional Military Education within the IDE process, and it's a huge privilege to be selected for in-residence IDE. I filled out my dream sheet, and the NPS School of International Graduate Studies was a perfect venue." Craycraft completed his joint PME requirement by distance learning before coming to NPS. Upon graduating, he will become an Air Force international affairs specialist with a focus on eastern and western Europe and Russia.

Some IDE students who choose NPS enroll in a special 12-month master's degree program, rather than the normal 18, and then attend the Defense Language Institute, also in Monterey, for six months of foreign language training in lieu of a thesis. Upon completing the DLI component, they receive an NPS graduate degree.

"I've heard only great things about NPS from civilians, and graduates and students who are already here," said 2nd Lt. Michael Phelan, a new GSP student specializing in western Europe in the National Security Affairs Department.

"We continue to work closely with AFIT to implement the 2002 memorandum of agreement," said NPS Acting President and Senior NPS Air Force Officer Col. Dave Smarsh. "Successes include

eliminating course duplication by moving programs; creation of oversight boards for acquisition, meteorology, space and aeronautical engineering; and sharing best practices."

NPS currently has eight Air Force faculty members, including Special Operations Chair, Defense Analysis Col. Brian Green Shields, and Lt. Col. Bryan Hudgens, a lecturer in the Graduate School of Business and Public Policy.

"NPS offers Air Force officers an unparalleled, high-leverage opportunity to become highly educated while achieving other important goals, like completing professional military education in residence and earning multiple professional certifications in a joint environment," said Hudgens. "Where else can you study defense acquisition in a truly world-class environment on a cutting-edge wireless campus with an award-winning library and renowned academic scholars working side by side with active and retired military leaders from senior levels of DoD to educate the next generation of leaders? And where else can you chat almost every week with senior government officials from DoD, the executive branch and Congress about their latest challenges and initiatives? From personal experience, I know all this really matters. My customers in the field tell me our NPS graduates are incredibly well prepared for very demanding jobs, and they want us to send more like them as fast as we can." 🇺🇸

## MOVES STUDENT SHOOTS ACTION FILM

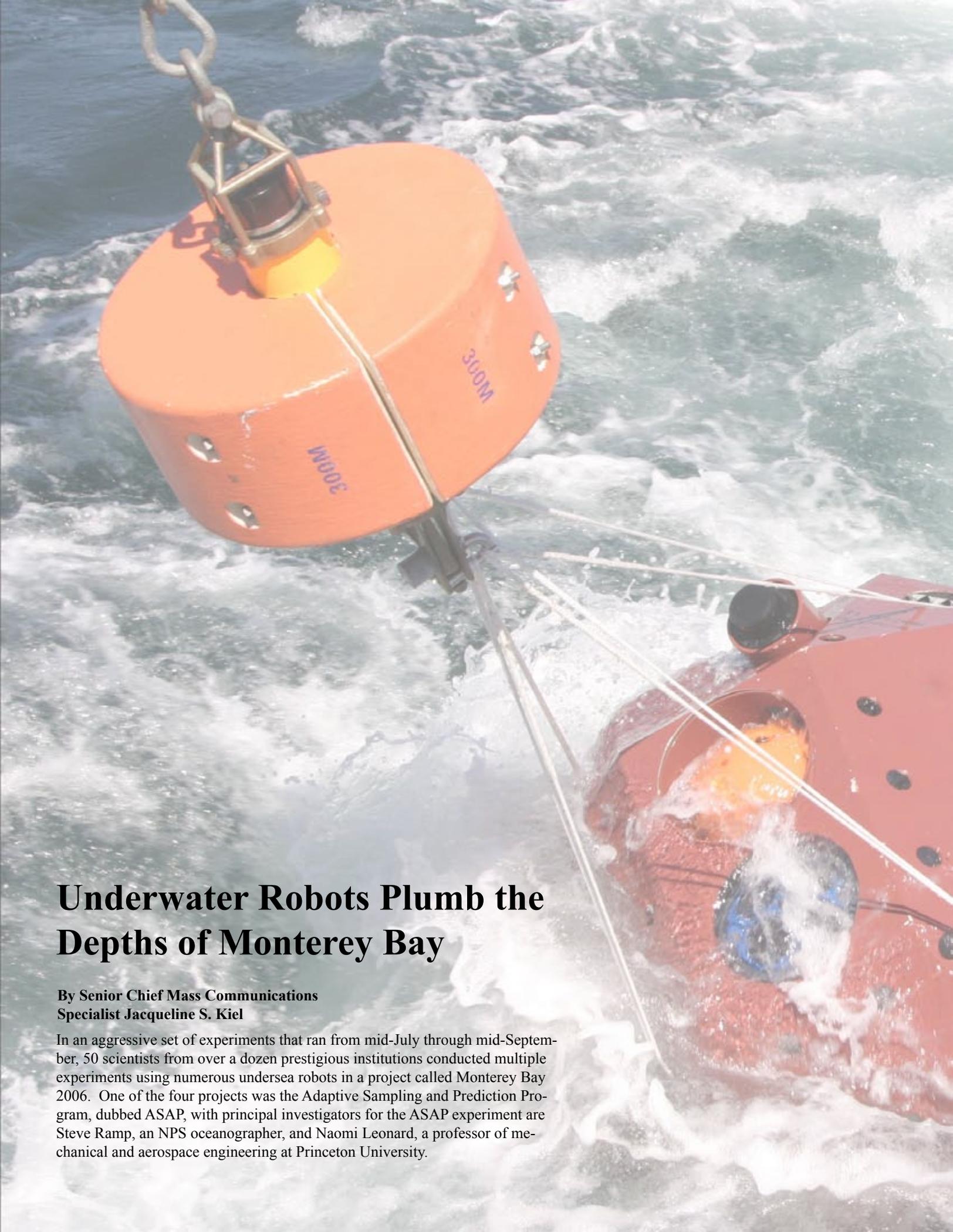
Air Force Capt. Leah Buckley, National Security Affairs Department – Middle Eastern Area Studies, repels from a building for a scene in Air Force Maj. Cliff Gyves' short action film, "The JMF Project." His film was a final video project for the MOVES Institute course MV3920, Digital Video Editing and Podcasting.

"(The class) teaches us how to use many of the tools applied to distributed learning programs. As the students learn to develop these tools, however, we get the opportunity to have fun with them," said Gyves. "The short film, 'The JMF Project,' has been a tremendous educational experience and a whole lot of fun for the participants, though it is a fictional story. This has been a great opportunity for a bunch of student volunteers and a handful of professors to let their hair down and have a little fun in front of the camera, hopefully creating an entertaining piece we'll all be happy to share."



## NPS' MOBILE WEATHER RADAR

Radar expert Paul Buczynski troubleshoots a data output coupler on a mobile Doppler radar unit in preparation for an experiment with the Research Vessel Point Sur. NPS' mobile weather radar (MWR-05XP) which is mounted to a flatbed truck will be operated from the school's beach lab to collect data to characterize propagation just above the sea surface. The experiment will advance understanding of the extended surface target detection ranges using near-surface effects and high-powered phased array antennas. The radar also serves as a testbed to explore weather nowcasting capability of tactical military radars. The MWR-05XP is a recent acquisition of the Department of Electrical and Computer Engineering and the Center for Interdisciplinary Remotely Piloted Aircraft Studies.



## Underwater Robots Plumb the Depths of Monterey Bay

By Senior Chief Mass Communications  
Specialist Jacqueline S. Kiel

In an aggressive set of experiments that ran from mid-July through mid-September, 50 scientists from over a dozen prestigious institutions conducted multiple experiments using numerous undersea robots in a project called Monterey Bay 2006. One of the four projects was the Adaptive Sampling and Prediction Program, dubbed ASAP, with principal investigators for the ASAP experiment are Steve Ramp, an NPS oceanographer, and Naomi Leonard, a professor of mechanical and aerospace engineering at Princeton University.

The intent of the ASAP project was to determine the best way to use multiple autonomous ocean vehicles to study ocean processes; to use a real-time data gathered by various measuring devices, including the autonomous vehicles, to improve computer models of ocean circulation; and to refine models for reliable prediction of the oceans complex processes.

The team used 10 vehicles in all with some of them in operation for 30 days, while others were in the water for about seven weeks, according to Ramp.

The ASAP experiment was a great achievement, according to both Ramp and Leonard. “We consider it a home run,” Ramp said. “We’ve got a fantastic data set with both observational data in the ocean and the output from three different very advanced numerical models.

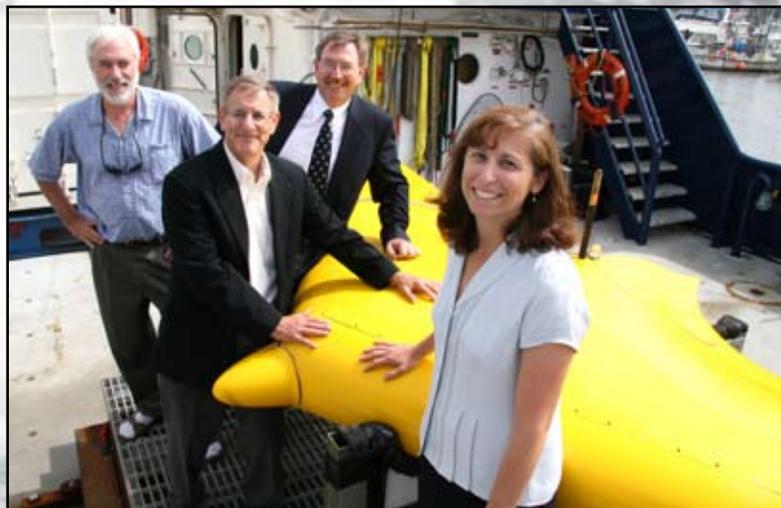
“This project was huge success also in the context of coordinated control, how to automate unique robotic sensors in these coordinated patterns to optimally collect data,” Leonard added. “So from here we go back and evaluate how well we did and we develop new and improved and exciting new ways to further pursue these accomplishments.”

As Ramp explained, the experiment worked according to plan because of the virtual pilot studies they conducted before actually putting the gliders into the water. “We basically ran the experiment about a half a dozen times virtually,” Ramp said. “If it didn’t work, we’d try something else. And we were able to do all this by doing computer simulations using Naomi’s control code and a virtual ocean that would force things to run around just like they would. We were left with ideas that actually worked.”

Leonard explained that the control code enabled the gliders to move as instructed. “In order for the gliders to move around on their own, they have to be responding to what they’re doing, to what the other gliders are doing and to what the environment is like,” she explained. “So you need some kind of algorithm, some kind of mathematical formula that takes that information and turns it into new direction, and it’s got to happen continuously. That’s what the Princeton computer was doing.”

The feedback was continuous. When a glider surfaced and sent data via satellite to the appropriate computer, constantly queried and received updated data, thus updating its instructions.

Additionally, there were very discreet times over the course of the month that the team decided to change patterns, even occasionally changing the direction of the gliders. “Sometimes the flow made them congregate,” Leonard explained. “When the flow is really strong, there were a couple of times when they were on top of each other, so what we did was to send one along its merry way and turn the other one around and have it go the other way, then reverse it again, so then they would be on opposite sides of the track where we wanted them.”



With the actual underwater portion of the experiment over, the real work begins. “Now the task is taking gigabytes and gigabytes of both observational data and numerical predictions and trying to figure out how to improve forecasting in the ocean,” Ramp explained. “This is going to be a huge task. We’re going to be working on that for the next couple of years.”

The team pushed the envelope for the amount of time each glider stayed in the ocean. This gave the team further insight. “The longer you leave vehicles in the ocean, you start to discover other failure modes, things that you haven’t seen before for instance, bio-fouling,” Ramp said. “We regard this as a learning process rather than a failure, and even the ones that failed did what they were supposed to do. They came up to the surface, stayed on the surface and said ‘I have a problem, here’s where I am.’”

The Office of Naval Research Program Manager Tom Curtain was instrumental in setting up the project. “Tom has been working in these areas,” Ramp stated. “He’s really our leader and a visionary. He’s the guy that really got all these people from different fields of endeavor and put the team together. He deserves a lot of credit.”

Curtain was pleased with the results, saying, “A lot of the goals we set out to accomplish 10 or 15 year ago are coming about.”

# STUDENT-FACULTY TEAM TESTS WIRELESS SURVEILLANCE, TRACKING NETWORKS WITH ROYAL THAI MILITARY

By Barbara Honegger

An NPS faculty, student and contractor team joined forces with 11 Navy Reservists from the Office of Naval Research Science and Technology program this summer to field test a rapidly-deployable surveillance and tracking network in a drug interdiction exercise in Thailand, the longest standing U.S. treaty partner in Asia.

“A critical backbone of the Global War on Terror and Network Centric Warfare is the ability to rapidly field low-cost mobile wireless communications networks with our coalition partners in hostile environments,” said NPS Information Sciences Research Associate James Ehlert, COASTS project director. “In the post-9/11 environment, it’s vital that we maintain the technological edge and share technology and expertise with countries facing similar threats.

“COASTS catalyzes this technology sharing while actively addressing the security needs of key allies,” he added. “It’s a win-win, because sharing technology and expertise that makes our partners more secure also makes us more secure. The Thais learn how to better secure their borders, interior and littorals, and NPS students gain valuable thesis research opportunities. With our DoD contractor partners, we operationally test cutting-edge commercial technologies in challenging terrains and climates and feed the results back to participating companies.”

The state-of-the-art, commercial-off-the-shelf (COTS) broadband wireless environmental and security monitoring network processed inputs from all local and remote sensors and instantly displayed them on laptops and wearable and handheld computer screens in an easily readable 3-D format. Data from unmanned aerial vehicles (UAVs); unattended air, ground and underwater sensors; balloons and speedboats was fed into Royal Thai Armed Forces command, control, computers and intelligence (C4I) centers and a Tactical Operations Center (TOC) staffed with U.S. and Thai personnel. The system also

included four mini helicopters and two flying wing UAVs with video cameras; Thai Navy speedboats conducting maritime surveillance and interdiction; a networked tethered balloon surveillance node with high resolution video; a mountain top communications node with video camera and web cam; a full-color night vision camera; and long-haul, point-to-point 802.16 and satellite reach-back links to the Royal Thai Air Force Headquarters in Bangkok.

“The COASTS surveillance and tracking network was able to transform visibility of only a few meters in hostile, humid jungle terrain into total shared situational awareness,” said Lt. John Richerson, COASTS-06 student team leader who coordinated and ran the riverine drug interdiction exercise from the TOC. “From 2005 to 2006, the sensor-to-shooter grid has evolved into a mature testbed for C4ISR COTS technologies while providing our students and DoD contractors with unmatched learning and product development opportunities.”

“The hardware is the easy part,” Ehlert noted. “The hard part is getting all the hardware, software and personnel to work seamlessly together.”

To hone that teamwork, Ehlert directed a growing cadre of NPS officer students and Navy Reservists. A detachment of 11 Reservists from the Office of Naval Research Science and Technology program participated in this year’s demonstration tests.

COASTS exercises have proven highly

valuable for the Royal Thai Armed Forces. The director general of the country’s Defense Research and Development Office, Lt. Gen. Apichart Timsuwan, and Royal Thai Air Force Group Capt. Teerachat Krajomkeaw, who heads the Combat



Royal Thai Air Force Group Capt. Teerachat Krajomkeaw (left); NPS COASTS-06 student team leader Lt. John Richerson (middle background); senior military officers from the Royal Thai Air Force and Interagency Intelligence Fusion Center; and NPS faculty network expert J.P. Pierson (right foreground) observe COASTS-06 surveillance and tracking operations from the TOC near Chiang Mai, Thailand.

Research and Development Organization within the Directorate of Operations at the Royal Thai Air Force Headquarters, sponsored the 2006 program.

“The COASTS-06 field experiment program has been a great opportunity for science and technology information exchange and for exercising combined interoperability between the Royal Thai Air Force and the U.S. military,” said Krajomkeaw at a Royal Thai Air Force headquarters after action meeting. “We hope to build on the success of COASTS-06 next year in COASTS-07.”

“Next year’s exercise -- a terrorist interdiction scenario culminating in the Port of Honolulu -- will add the Malaysian Maritime Enforcement Agency, the Office of Defense Cooperation Indonesia, Australia and the U.S. Navy (Commander, Seventh Fleet) and Coast Guard assets in

Hawaii as additional operational partners,” said Richerson. “The exercise will also provide major warfighting value to the Navy Expeditionary Combat Command recently charged with implementing the CNO’s vision for small boat patrol craft just taken over from the Marine Corps. It will be an order of magnitude larger than previously, with multi-national partners, a multi-million dollar budget and major Congressional attention.”

“The technologies and capabilities demonstrated in COASTS-06 would be extremely useful for our operations in Southern Thailand,” said Royal Thai Air Force Air Marshall Suthichoti. “And they’re applicable not just to the Air Force, but to the (Thai) Army and Navy as well.”

“This was a wonderful opportunity to engage in military-to-military contact with the upper echelon of the Royal Thai Air Force that I’ll be able to leverage throughout my career,” Richerson added.

COASTS-06 was also of high value to the project’s 12 commercial participants, including leading design engineers and three corporate chief executive officers.

“A big plus for COASTS commercial team members is that we can special engineer our equipment for worst case scenarios and test it in weather and terrain scenarios we wouldn’t otherwise have access to, providing invaluable data for future product development,” said Mercury Data Systems’ COASTS liaison, senior network engineer and Navy Reserve IT3 Ryan Hale. “The same communications system that has a ten-mile footprint in Monterey, California, for instance, has only a one-half-mile footprint in Thailand, due in part to the high temperature and humidity of the area. You have to test in the actual environment to know how to

configure the system.

“COASTS is one of the most unique programs connecting the military and commercial worlds,” added Hale, also a former Information Sciences research assistant at NPS. “It lets us work hand in hand with the military in the design and development of an all-COTS system with real world applications. Being a full partner has also opened DoD doors for us, for example with the Office of Naval Research. As a result of our participation, we now also have opportunities with the Naval Research Laboratories, the Special Operations Command and others.”

Some commercial technology used in the project was originally developed for COASTS. An example is Mercury Data Systems’ TrakPoint, a mobile shared situational awareness tracking program that uses software and inertial gyros to



*NPS Operations Research student Ensign. “Red” Miller on the ground in Thailand during COASTS-06 with a Kestrel shoulder mount camera, ruggedized 802.11g portable computer and Demy-GPS technology that allows his position to be calculated in a non-GPS environment.*

locate and visually display where the user has walked on a laptop or workstation screen. By clicking map icons, a viewer can instantly see what is being recorded by cameras and other recording devices at multiple distant locations in near-real time, and access to the displays can be hierarchically controlled.

COASTS-06 U.S. sponsors include the Office of the Secretary of Defense; U.S.

Pacific Command (USPACOM), with Mr. Chris Voght, USPACOM staff science adviser, as chief liaison; U.S. Coast Guard Monterey; U.S. Embassy Bangkok; Joint Interagency Task Force-West; U.S. Marine Corps Systems Command; Air Force Research Laboratory; and U.S. Military Advisory Group Thailand. International sponsors, participants and observers included the Royal Thai National Security Council; Royal Thai Research and Development Office; Interagency Intelligence Fusion Center at Chiang Mai; Royal Thai Air Force Academy; and the Australian Defense Technology and Management Advisor, Thailand.

In addition to Ehlert, COASTS-06 NPS faculty members included sensor expert Dr. Gurminder Singh, Ed Fisher, and networking expert John Pierson, also a member of the NPS Innovation and Technology Center.

NPS students participating in the NPS-Thai exercise were Lt. John “Swampy” Richerson, student team leader; Lt. Robert “Ho” Hochstedler, Lt. John Powers, Ens. Ryan “Red” Miller, Ens. Joseph Russo and Ens. Michael Chesnut. The eleven ONR Reservists, under the command of Capt. Dan Burns, were Capt. Paul Marshall, Officer in Charge; Cmdr. Paul Kling, UAV expert and Assistant Officer in Charge; Capt. (Sel.) Pete Gamedinger; Cmdr. Scott Guinn, Assistant Air Boss; Cmdr. Dean Schmidt; Cmdr. Nathan

Beltz; Lt. Cmdr. Steve Padgett; Lt. Cmdr. Kevin Blenkhorn; Lt. Joe Berrios; Lt. Pitch Bencharit and AT1 Candido Gomez.

In addition to being NPS’s inaugural COASTS partner, at any one time Thailand supports up to half a dozen officer students at the Naval Postgraduate School pursuing thesis research in support of their country’s security needs. 🇹🇭

# HIGH TECH TAKES NEW COURSE IN SOLAR ENERGY RESEARCH

By Senior Chief Mass Communications Specialist Jacqueline S. Kiel

It just makes good business sense. Why pay for something you're not using? That's the way the Army is thinking, and it's taking a few Naval Postgraduate School faculty and students to assist in the endeavor.

It all started with some initiative on the part of an NPS instructor, a small company and four thesis projects.

Calling Atira Tech a small company is a bit of an understatement. Born in Bulgaria, but now a proud naturalized American citizen, engineer Stefan Matan started Atira Tech by working out of his garage with an idea and a soldering iron in his hand.

The person spearheading the project here at NPS is Ron Tudor, a lawyer and a lecturer in the School of Business and Public Policy (GSBPP). According to Tudor, the perspective of this type of project is focused on the small micro business, not by giving them money, but by giving them knowledge and the opportunity to grow and to develop products that would be useful to DoD.

The new technology is a power extraction technology that lowers the resistance of electrons to leave the outer valance shell of atoms in the solar panels, thus easing the flow of energy. The difference in power available from a regular solar panel and one that includes the Atira Tech circuit is amazing. Simply put, the circuit increases efficiency. The Atira technology has other advantages, according to Tudor. "To convert direct current (DC) into alternating current (AC) usually results in a power loss of about 40 to 50 percent, in other words wasted power," Tudor explained. "Atira's inverter converts DC to AC with only a 10 percent loss making it much more efficient."

While the new technology makes good business sense, there are much larger ramifications. This technology could improve field

situations for the Army, right down to the individual soldier. That is one of the goals, but of course, it's still in the research phase.

Tudor found out about the project through a fellow lawyer, was fascinated by it and ran a proposal to take it to the next level via the NPS business school. He was influenced by Lt. Gen. John R. Vines who had actually received a couple of prototypes while in Afghanistan as the task force commander. Vines, Commander of the 18th Airborne Corps, while initial set ups were going on, contacted Tudor and let him know how serious the Army was about the technology.

"I went ahead and put together a proposal on what we would look at and what we would do," Tudor said. "I routed it through the dean of the business school, then Danielle Kuska, and Leonard Ferrari, then dean of research, and they signed off on it. I forwarded this to General Vines and it came back signed."

Tudor also has the support of current GSBPP Dean Robert Beck. "I am very proud to see this kind of ground-breaking research that Ron is doing," Beck stated. "His work is a classic example of how our cutting edge research is relevant to achieving our mission and makes our business and public policy school a leader in developing new knowledge."

Tudor took a hold of the project and ran with it. "The first thing I did was go to the Army Soldiers Systems Center and had them take a look at it," he explained. "I started students off doing thesis projects."

The first two dealt with the economic benefit of changing out disposable batteries with rechargeable batteries, according to Tudor. The difference between the two theses was unit size. "We did it from the brigade-sized organization all the way down to the individual soldier," Tudor explained. "It literally turns out to be millions of dollars saved for a single brigade. It is millions of dollars a year getting rid of the disposable batteries and using rechargeables."

## RESEARCH SHOWCASE

A major goal of the NPS research program is to provide unique, cost-effective laboratory facilities that enable students and faculty to support Navy and DoD needs. NPS research projects have also been a catalyst for defense innovation.

"NPS is truly an engine of ingenuity for the services," said Danielle Kuska, director of the Research and Sponsored Programs Office.

A showcase of current research initiatives is available on the web at:

[WWW.NPS.EDU/RESEARCH/NPSRESEARCH.PDF](http://WWW.NPS.EDU/RESEARCH/NPSRESEARCH.PDF)



NAVAL POSTGRADUATE SCHOOL

### Bomb Strike Exercise for Mine Countermeasure

**Project Objective:**  
Improve warhead lethality for use in quick, precise and accurate strikes on known enemy naval minefields in the littoral combat environment.



**Project Synopsis:**  
This project is funded by ONR to improve fleet naval-mine-clearance capability and success. Several experiments were conducted in which bomb-like rigid bodies with a density ratio similar to operational munitions (namely the MK-84 general purpose bomb) were launched into a hydrodynamic test tank. The resulting data will be used for numerical verification of the initial three-dimensional model (STRIKE35), aimed at predicting overall trajectory, maneuvering, burial depth, and orientation of a falling, high-velocity, rigid body in the air-water-sediment column.

The third thesis answered the question of what it would take to power up the entire city of Baghdad, with a focus on houses, schools, police stations and hospitals. “This becomes an effects-based operation,” Tudor explained. “What is the psychological impact of an operation such as this? Students did the calculations to figure out how much it would cost to power up all of Baghdad. It turned out to be six and a half billion dollars.

“Compare that with how much is being spent on a daily basis for operations,” Tudor exclaimed.

The final thesis focused on Ft. Bliss. “The fourth thesis looked at how much energy is available at Ft. Bliss,” Tudor explained. “It covered the economic analysis for what would it take to power up Ft. Bliss, what would the cost be as we started into an initial pilot plant, and it still turns out that your fossil fuels are probably cheaper than solar energy, even with the technology we’ve got, but it’s competing with nuclear energy. With what we’re doing now, I would say we would reach parity with grid power and that’s a big statement.”

The first phase of the Fort Bliss project is scheduled to begin Oct. 17 and is expected to last several months. It will generate a total of 1.5 megawatts of power. “Once we run this first phase and we pull the power out of that, we want the data for about six months before we start moving into Phase Two,” Tudor said.

Phase Two will begin around fall of 2007 and generate 20 megawatts of power. Tudor said that is more energy than the largest solar energy installation in the world, which is a plant in Germany that currently generates 12 megawatts.

The plan for Phase Three is to generate 40 megawatts in the fall of 2008 and by the fall of 2009 Phase Four would kick in with a whopping Gigawatt of power.

The Ft. Bliss project will be run just like the Apollo program, according to Tudor. “We’re not running forward on a pure economic model out there,” he stated. “We’re taking a scientific approach to go out and soundly vet this technology and to prove the technology and to stair-step it up. We go in with the one-and-a-half megawatts of power to validate the technology and to see how much power we’re actually producing. Once you put something like that in a field environment, and it’s exposed to dust,



*Lecturer Ron Tudor shows solar panels, one with an experimental circuit that could revolutionize military field operations.*

heat, humidity, insects and pigeon poop, because Ft. Bliss has got a lot of pigeons, we have to figure out what we’re getting.”

What they’re looking for initially is grid parity in terms of cost. “If Ft. Bliss wanted to go pay for the power to run their ranges, they would pay no more to us or to this concept to power up the ranges than they would pay to El Paso Electric to come out and run power to them, so the cost to them is the same,” Tudor stated.

Even with the technology, and assuming it in fact does what is expected of it, there are drawbacks. “Your biggest drawback with solar energy is not the cost of solar panels, equipment or anything else, it’s the land,” Tudor explained. “Solar energy requires surface area – lots of surface area.”

However, there are ways to work around the issue. “Go to a warehouse owner and say ‘Let me put all these solar panels on the roof of your building, your energy to run your warehouse is free, and all the excess energy, I get to pump to the grid and make money on it.’ Who would say no?”

If all goes well with this research over the next couple of years, Atira Tech won’t be that small company that exists in an engineer’s garage. It just may be the next big thing for energy. Who knows. The world benefit could be enormous. It all waits to be seen. 🚀



# ALUMNUS PHONES HOME ... TO NPS

By Senior Chief Mass Communications  
Specialist Jacqueline S. Kiel

While making history is not a first for the Naval Postgraduate School, the school did recently experience another first, with a video teleconference between NPS students, faculty, staff and their families and astronaut and Army Col. Jeff Williams on board the International Space Station (ISS).

Williams, who was on the space station for five months, earned a Master of Science degree in aeronautical engineering and the degree of aeronautical engineer from NPS in 1987. "Rudy (Professor Rudolf Panholzer, chair of the Space Systems Academic Group) was a professor here at the time Jeff was a student," NASA Visiting Professor and active astronaut Jim Newman explained.

And it was Panholzer who had a big hand in making the event happen. The video teleconference occurred because of a casual talk he had with Newman. "In talking to Rudy shortly after Jeff's launch, we discussed the possibility of the event," Newman said. "Rudy encouraged it. SSAG was originally the focus for the VTC, but Rudy liked the idea of including everyone."

NPS provided four viewing rooms, three of them interactive, meaning that two-way conversations were possible. All rooms could see Williams, but he was only able to see into one of the viewing rooms this time.

It was standing room only in most of the areas set aside for the special event. After all, how often do you get to be a part of something so unique?

"I thought it was incredible," said Val Jensen, NPS Foundation's administrative assistant, who was in one of the packed rooms. "I think we forget those people are out there. I really liked connecting with somebody in space and the fact that he studied [at NPS] made it better."

The audience was joined by two gentlemen who were NPS professors when Williams was a student. Both were thrilled to be able to speak with their past student. "This is absolutely wonderful," exclaimed Distinguished Professor Emeritus Max Platzer. "It's wonderful to see how our NPS graduates are doing. It's wonderful to see a former student perform so well in space. As a professor, you can't ask for anything more. For me, it's almost 20 years later. Can you imagine that," he added enthusiastically.

Prof. Edward M. Wu, William's thesis advisor, said, "I actually have eight or nine former students in the astronaut corps. You can tell good students and team players. They get selected, and that's no surprise. Most gratifying is that they remember us," he added.

The VTC began with an introduction by Newman and opening comments from Acting President Col. David A. Smarsh from one of the primary spaces set aside for the teleconference. After connectivity was established, Smarsh offered words of welcome to Williams.

After some banter between Williams, Platzer and Wu, Williams talked about his time then on board the ISS, and the various missions, spacewalks, and the upcoming shuttle mission.

“Now we’re getting ready for Atlantis to show up,” Williams said. “They’ve got a very aggressive mission ... to continue the assembly of the space station, which of course we need to do. That’s the priority, so that we can move on with the nation’s exploration program.”

That shuttle mission will include two more NPS alumni, Navy Capt. Christopher Ferguson, who received a Master of Science in Aeronautical Engineering in 1991 was the pilot, while Navy Capt. Brent Jett, Jr., who received a Master of Science in Aeronautical Engineering from NPS in 1989, was the commander. “We look forward to seeing them,” Williams continued. “Of course they’re going to bring some goodies. I heard a rumor. We’ve got a freezer on board here now that the last shuttle brought up for experiments. We heard a rumor this week that they might be bringing some ice cream, and after five months in orbit, you know that we’re really looking forward to that.” During his presentation, Williams spoke poignantly at times. “It’s been very challenging,” he said. “As many of you know, deployments are not easy. One of the things I do to keep myself going day by day is remind myself about all of our soldiers, sailors and airman deployed in the war in not so pleasant parts of the world.”

Williams was obviously having a good time with the event, answering questions with sincerity and at times, a marvelous sense of humor. In response to a question about whether care packages were received at the space station, Williams said that families are given the opportunity to send a few things up. Those items can include books, snacks, specials gifts, cards and other requested items. “The last shuttle brought up pickles, which for some reason I was craving, but I don’t think I’m pregnant,” he said, causing a burst of laughter among the audience.

In response to a question about how earth looks from the space station, Williams replied, “The earth is an incredibly beautiful sight from orbit, and I’ve taken lots of pictures. In fact, they tell me that we’ve set the record for crews. We’ve taken about sixty thousand pictures.”

The entire VTC lasted about 30 minutes and judging from comments people were making after the fact, it was a total success. “It seemed to be very well received by everyone, including the kids,” Newman said. “That he’s looking forward to coming back to NPS for a visit after his recovery time is great,” said Newman, making note of a comment Williams made about returning to NPS for a presentation next year.

A Russian Soyuz departed Kazakhstan in mid-September and docked with the ISS a couple of days later. There was about a one-week turnover, then Williams and Russian cosmonaut Pavel Vinogradov headed home. Taking over for Williams on the ISS was Navy Captain Michael Lopez-Alegria, the commander of the ISS for Expedition 14. He received his Master of Science in Aeronautical Engineering from NPS in 1988. He responded enthusiastically when asked if he, too, would like to speak to the folks at NPS during his Expedition, and we are shooting for a late January to mid-February event. 📺

## ALUMNI MILESTONES

More than 45,000 military officers from all U.S. services and over 70 nations have earned advanced degrees at NPS.

Many of these alumni are in key leadership positions throughout the armed forces.



*New Colombian Chief of Naval Operations is electrical and computer engineering alumnus, Adm. Guillermo Barrera (back row, second from right), shown with his engineering classmates prior to graduation in December 1983.*



*Army Maj. Gen. Michael A. Vane, vice director for Force Structure, Resources and Assessment, J-8 (left) pictured with Air Force Col. David Smarsh, acting president, and Dan Boger, chairman of the Information Sciences Department. Vane, a 1985 alumnus in system technology (command, control and communications), received the Distinguished Alumni Award on Sept. 12.*

## DO YOU HAVE ALUMNI NEWS?

We always like to hear from our alumni. Please let us know about your recent news by emailing Alumni Relations at:

[ALUMNI@NPS.EDU](mailto:ALUMNI@NPS.EDU)

# PACIFIC FLEET COMMANDER WELCOMES MONTEREY'S NEWEST CPOS

By Senior Chief Mass Communications Specialist Jacqueline S. Kiel

Monterey Peninsula commands added five new chiefs to their ranks on Sept. 15 with the completion of the annual new chief petty officer training, finishing with the pinning ceremony. With close family, friends and all the area chief petty officers in attendance, the five were pinned and covered in typically ceremonial fashion.



NPS' newest CPO, ETC Richard Segovia is congratulated by Adm. Gary Roughead.

The new chiefs are ITC Christopher Hillery, AGC Matthew Euler, CTIC James (Tom) Glass, ETC Richard Segovia and CTIC Suzanne Abarca.

The celebration was even more special as the guest speaker of the event was Commander Pacific Fleet Adm. Gary Roughead. Here for a Naval Postgraduate School site visit, Roughead was pleased to be able to address the new chiefs. "This promotion is not about what you have done to become chief petty officers," he said, addressing the new chiefs.

"It's about what you can do now. We are going to expect a lot of you.

"I still remember my first chief's lessons," Roughead continued. "He taught me, and in many ways he disciplined me. You are going to affect those above you too."

Roughead poignantly finished his comments by saying, "I thank you for this opportunity to share this day with you."

It goes without saying that there were smiles all around. Family members were quick to say how proud they were of the new chiefs. "I couldn't be more proud - this from an ex-mustanger," said Tom Glass Sr., a retired commander with 30 years under his belt. "You can't do better than Chief."

All Glass Jr. could think about during the ceremony was "Just don't cry, and don't fall down," he exclaimed. He didn't do either. He just beamed throughout the ceremony.

"Wow, this has finally come true," said Hillery, who made chief petty officer during his 19th year in the Navy. He received an extra surprise when his mother, Sharron Parker, unexpected showed up at the pinning. "I got your back," she told him after the ceremony.

Abarca, the most junior of the five, with seven years in the Navy, was shocked by her selection. It's just been such a trying process," she said, "and to have been only seven years in the Navy, it's just overwhelming."

"I'm proud of her, and I know her dad is too," exclaimed Abarca's husband Tom.

At the end of it all CTICM Shannon Hickman, the senior enlisted person in the Monterey Peninsula area, stated, "It was a challenging and memorable season of transition culminating with the induction of five new and talented chief petty officers into the Mess." 🍷

## ADMIRAL BRIEFS MONTEREY NAVY LEAGUE COUNCIL



(Left) Donald Layton stands with Commander Pacific Fleet Admiral Gary Roughead in front of a Fresnel lens located at Monterey California's Maritime Museum during a Navy League hosted event. Layton is a pioneer of lighter-than-air craft and NPS professor emeritus.

(Right) Roughead updated the group of Navy supporters on the state of the Pacific Fleet: "Your fleet is maintaining the sea lanes of commerce, free from the disruption of terrorist attacks."





# PHOTO GALLERY

The all-new, online *Photo Gallery* provides a snapshot of the latest educational and research developments at NPS. The gallery offers:

TEXT & KEYWORD  
SEARCH CAPABILITY

ENLARGED &  
FULL SIZED IMAGES

GRADUATION &  
OTHER PHOTO  
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