NPS alumnus Adm. William McRaven has made quite an impact on our nation’s most critical special operations, but it was his studies at NPS — and his pen — that may have made his mightiest.

INSIDE:
Vice Chief, NPS Alumnus Adm. Mark Ferguson Outlines the Future Force
The New Face of Intelligence, Surveillance and Reconnaissance
Research Reports: A-10 for Atmospheric Research, CubeSats Set for Launch
The Center on Contemporary Conflict’s well-earned reputation in intelligence, surveillance and reconnaissance (ISR) in current and future defense strategy is expanding. Fortunately NPS’ dedicated Remote Sensing Intelligence degree program will provide a steady stream of well-educated ISR leaders.

The New Face of ISR

The role of intelligence, surveillance and reconnaissance (ISR) is expanding....

Leading the Effort to Counter WMD

The Center on Contemporary Conflict’s well-earned reputation in developing strategies for the U.S. and its allies to counter the threat from Weapons of Mass Destruction has just earned the prestigious group a much-expanded role in this global effort.

ON THE COVER

Adm. William McRaven is the quintessential special operator, and he has left quite the mark on national security through the forces and operations he commands. But with McRaven, the old adage of the pen being mightier than the sword, or in this case the spear, may very well apply. The NPS thesis he completed in 1993 has become the de facto handbook for special operations theory, and the curriculum he started has now produced nearly 200 graduates. In this edition of “In Review,” we examine the power of his pen, and its impact on the spear.

NAVAL POSTGRADUATE SCHOOL

IN REVIEW

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For free subscription information or to submit your comments or suggestions on “In Review” magazine, contact dmkekkas@nps.edu

All of our students will progress to leadership within the Department of Defense and far beyond … not just one or several of them, all of them. They have excelled through their careers, they have already led in various capacities, and they will go on to positions of greater and greater responsibility. Providing these leaders with a graduate education is a powerful, valuable obligation.

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For free subscription information or to submit your comments or suggestions on “In Review” magazine, contact dmkekkas@nps.edu
President Oliver Keynotes AFIT’s Latest Graduation Ceremony

NPS President Dan Oliver served as the keynote speaker for the Air Force Institute of Technology’s (AFIT) latest commencement ceremony held at the National Museum of the United States Air Force, March 22.

“This is a special treat for me. Because of my time at the Naval Postgraduate School, and especially because of the time I have served on the Air University Board, AFIT subcommittee of that board, that I have developed a very special admiration for the Air Force Institute of Technology’s (AFIT) mission. It is not only the mission of promoting learning and research, it is my experience, it is the Air Force Institute of Technology’s mission to put to use the human intellect for the betterment of our nation,” said Oliver. “The mission, the mandate of AFIT is to advance air, space and cyber power for the nation, its partners, and our armed forces by providing relevant defense-focused technical graduate and continuing education, research and consultation.”

Oliver told the audience of graduates, students, and staff that AFIT’s mission is to advance air, space, and cyberpower for the nation, its partners, and our armed forces by providing relevant defense-focused technical graduate and continuing education, research and consultation.

“AFIT is a part of the larger Air Force family, and it is a family that cannot be duplicated feasibly and with ease. It is a family that can only happen with people who come from all walks of life and from all walks of life,” said Oliver. “AFIT is a part of the larger Air Force family, and it is a family that cannot be duplicated feasibly and with ease. It is a family that can only happen with people who come from all walks of life and from all walks of life,” said Oliver.

AFIT, located at Wright-Patterson Air Force Base, Ohio, is the Air Force’s graduate school of engineering and management, as well as its institute for technical continuing education. AFIT’s mission is to advance air, space, and cyber power for the nation, its partners, and our armed forces by providing relevant defense-focused technical graduate and continuing education, research and consultation.

Students, Staff Honored During Ceremony at Japanese Consulate

At the invitation of Hiroshi Inomata, Consulate General of Japan, several NPS students and staff officers assigned to the Naval Postgraduate School were honored during a ceremony at the Presidio of San Francisco, Mar. 13. The event commemorated the one-year anniversary of the 2011 tsunami and earthquake in Japan.

Ureihi’s sentiment is one that has also been noted by the Navy’s most senior leadership, including Chief of Naval Operations Adm. Jonathan Greenert.

“Today’s ceremony is one that is not only good for the individuals who are present here, but good for the United States as a whole. It is a time to remember the lives that were lost, and to remember the strength and resilience of the survivors.”

Navy’s Cyber Commander Participates in NPS’ ID Symposium

Vice Adm. Michael Rogers, Commander of U.S. Fleet Cyber Command and the U.S. 10th Fleet, visited the Naval Postgraduate School to present at the university’s Information Domination Senior Leader Symposium (IDSSL), Jan. 29–31. Facilitated by NPS’ Center for Executive Education, the IDSSL is designed to create a senior level forum to engage in and enhance core competencies in senior leaders within the Information Domination (ID) community.

Rogers attended a series of lectures and presentations related to the diverse fields within ID and cyber defense during his visit. He also met with members of NPS recently established Cyber Academic Group to discuss future programs related to cyber education.

“At the 10th Fleet Commander, clearly cyber is one of our primary missions — and an important element of our success in the cyber arena is going to be the knowledge and the abilities of the workforce,” said Rogers. “The Naval Postgraduate School has an important part to play in helping educate the cyber workforce of the Navy of the future.”

An essential part of this equation would be the education NPS is providing to the Navy’s workforce.

Rogers emphasized the role of graduate education, and forums like the IDSSL, in developing the Navy’s cyber community, particularly in the officer arena, and wanted an introduction to the university’s cyber curriculum.

“The NPS has this critical role to play in helping educate the cyber workforce — I wanted to come out here and see it for myself,” said Rogers.

“The Information Domination Senior Leaders Symposium is designed to develop a senior level perspective that results in a warfare capability integrated in all phases of the joint and naval fight,” said retired Rear Adm. Andy Singer, NPS Intelligence Chair Professor and Director of the Information Domination Center for Excellence.

“During eight very full days, leaders learn about themselves, Information Domination as a key element with naval and joint war fighting, in concert with applied leadership, management and strategy tools and models,” he added.

Individual Rights Leader Offers Thought-Provoking Talk

As President of the Ayr Rand Center for Individual Rights, Dr. Yaron Brook has become a well-known and outspoken leader in individual rights and capitalism.

During a recent edition of the Secretary of the Navy Guest Lecture series, Feb. 28, Brook shared his sometimes controversial but thought-provoking insights into why a free and true capitalism, or corporatism.

“I immigrated to this country almost 25 years ago and the reason I immigrated to this country has a lot to do with why a lot of you joined the military,” said Brook. “I looked at my life and I said where in the world could I make the most of my life? … It turned out that it was here.”

Brook asked the audience what they believe makes America such a great country, and why after so many years, so many people still need much hardship to become American citizens.

“The answer to him, he noted, was freedom.

Brook stated that returning to economic freedom was the key to emerge from the current economic problems the world faces, noting that history demonstrates that more economic freedom leads to more prosperity.

“I thought the presentation was outstanding,” said NPS student Navy Lt. Jessie Hallan, who nominated Brook for the SGL. “It was very informative and inspiring.

“Join the school that may not have agreed with the content of new Dr. Brook presented but I hope it will inspire some more thought into the issues that are plaguing our country,” Hallan continued.

“As the future leaders of the Navy, it is important to have knowledge of our country’s past and our country’s present,” said Hallan.

Brook continued on page 6.

Secretary of the Navy Guest Lecture Series

NPS, DLI PLC Honored with CENIC’s Innovations in Networking Award

The Corporation for Education Network Initiatives in California (CENIC) presented the Naval Postgraduate School and Defense Language Institute Foreign Language Center (DLI-FLC) with the 2012 Innovations in Networking Award for Educational Applications, Mar. 13 during CENIC’s Annual Conference in Palo Alto, Calif.

“The award recognized the two institutions’ efforts to establish a regional academic network, executed with the completion of the NPS-assisted migration of the Army language school off the traditional MILITARY network to a more academic, IDU domain.

“This is a proud and celebratory moment for both NPS and the Defense Language Institute. CENIC has been an invaluable partner for both of our institutions,” said NPS Vice President, Information Resources and Chief Information Officer, Dr. Christine Haska. “By supporting our transition to a IDU network, CENIC has empowered NPS and DLI to be more capable of accomplishing our respective missions in education and research. To be recognized by such a prestigious organization, and to be voted as the Network Innovations’ best among an amazing group of institutions, truly is an honor.”

“I believe this project will serve as a model for others to follow. As we move into a more restrictive budget climate, it is important to find innovative ideas to do more with less,” echoed Col. Daniel Pick, Commandant of DLI-FLC. “Over the next year, a combined team of NPS and DLI technicians and academicians will build a new computing environment that will significantly improve the ability of DLI to fulfill its mission of enhancing the linguistic readiness of 15,000 sailors and marines.”

NPS President Dan Oliver praised the effort, noting that it is a critical step toward a consistent, active partnership among local DOD institutions, a notion local Congressman Sam Farr (D-17) has emphasized with his Team Monterey concept.

“As the DOD and leadership of our country shift the defense strategy, it is going to become increasingly important to streamline operations at local levels to ensure that we are collectively good stewards of the taxpayer’s money,” said Oliver. “The Team Monterey Network is a perfect example of how operational efficiencies can be achieved through strategic partnerships.”

Approximately 3,800 Soldiers, Sailors, Marines and Airmen are enrolled out of DLI-FLC, studying 23 languages and two dialects. Both institutions have been working since 2008 on the effort to establish a single academic network to enable students to leverage modern technologies and improve capabilities.
of the many methods to find solutions. Different points of view help to find these solutions.”

Navy Lt. Cmdr. Brad Coleman was one of those students who may not have necessarily agreed with Brookes’ views, but saw the value in hearing opposing perspectives. “I think Dr. Brookes’ presentation was interesting and very thought provoking,” said Coleman. “I think SCIAs should be chosen because they challenge the status quo of any organization through logical arguments.”

**Defense Security Cooperation Agency Director Speaks to DRMI Students**

Vice Adm. William E. Landay, III, NPS graduate and Director of Defense Security Cooperation Agency, addressed a collective of

Defense Resources Management Institute (DRMI) students about security cooperation and partner nations on national security policies, defense policies and military strategies, and to share what is known in developing nation capabilities.

Landay is a Systems Technologist (Command, Control, Communications and Intelligence) graduate from NPS.

**Physics Faculty, Student UNLV Lab Lecture for Seaweb Research**

Ena. Rebecca King, a Space and Naval Warfare Systems Center Pacific (SSC PAC) research fellow, helped SSC PAC Engineer Chris Fletcher, right, deploy a teleonar modulate in Lake Del Monte on the NPS campus, April 16.

Ena. Rebecca King, left, a Space and Naval Warfare Systems Center Pacific (SSC PAC) research fellow, helped SSC PAC Engineer Chris Fletcher, right, deploy a teleonar modulate in Lake Del Monte on the NPS campus, April 16.

**CRUSER Welcomes DARPA Manager for Latest Faculty Lecture**


Littlefield’s lecture focused on new technologies being explored by DARPA in the field of unmanned vehicles and presented potential areas of collaboration with NPS. He noted during his presentation that the university’s mission of graduate level education and research, driven by operational relevance, presents many opportunities to combine efforts.

**CAG Welcomes New Professor**

To help meet these objectives, a number of faculty at NPS have joined together to form an interdisciplinary Cyber Academic Group (CAG), dedicated to building the school’s Cyber Systems and Operations master’s degree program, and helping further collaboration in the field. Leading the charge are Professor Cynthia Irvine, Chair of the CAG, and Distinguished Professor Dorothy Denning, Associate Chair. “Cyber is a domain of warfare that has become increasingly important to all of the services,” said Denning. “We need to excel in this domain.”

In the January 2012 “Priorities for the 21st Century Defense” report, the Department of Defense listed cybersecurity operations as one of the 10 primary missions of the armed forces. The growing threats posed by adversaries within the cyber domain have DOD placing a perpetually increasing focus on advancing the nation’s ability to defend its networks and create resilient systems.

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The group started with a basic idea: to develop a central catalog to find theses. This is one of many methods to find solutions. Different points of view help to find these solutions.”

NPS Establishes Interdisciplinary Cyber Academic Group

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Quick Hits

30,000 lb slab of granite.

During experimentation, robots floated on a cushion of compressed air passing through a series of supersonic air nozzles in the precision slab, essentially simulating how a real spacecraft reacts in the vacuum of space. Maneuvers can be accurately calculated and predicted in various movements, allowing for a diverse program of student/faculty research through the lab.

Because of the enormous weight of the granite, to include the large mobile crane required to heft the behemoth stone, a labyrinth of buttressing was fitted into the lower floor of Halligan Hall as a precaution, and the existing lab space. Had to accommodate the upgrade in capability. FFSP is the first DOD program to meet skill sustainment and professional development goals for all FAQs from all of the uniformed services.

Participating officers took part in discussions and presentations with topics ranging from the Afri- can economy and terrorism to security and stability, among many others. Glosny’s presentation focused on Chinese intervention in Africa, and provided a broad overview of the Chinese influence in Africa and its increased interest and investment in the region. He also discussed the effects of these interventions on U.S. interests.

FFSP in-residence courses bring selected FAQs to Mon- terry for advanced seminars on se- curity policy and international poli- tics for the regions in which they operate, taught by NPS faculty and outside experts. The NPS itinerary is followed by a regional program, often overseas, that focuses on a specific region’s security affairs.

New Book Compiles the Strategies of CCCMR’s Combating Terrorism Efforts

The Combating Terrorism Fellowship Program (CTFP) has worked more than 145 countries on sharing strategies to combat terrorism and has provided a forum for those countries to recognize the needs of every student. The book created one more resource for our friends and partners to use when making decisions about risk assessment, resource allocation, ethics or mea- sures of effectiveness in combating terrorism.

“Teaching to a broad range of backgrounds, such as those here at NPS, forces you to try to meet the needs of every student,” Hacker noted. “If you can succeed, it is very rewarding because you can see that everyone gets something out of the class, regardless of where they came from.”

Receiving promotion to As- sociate Professor and tenure are David Alderson from OR, Jomana Amara from the Defense Resources Management Institute, Araque from the Graduate School of Busi- ness and Public Policy and Michael Freeman from Defense Analysis.

Promotion and Tenure Actions for Academic Year 2012

The university welcomed a new director for its NPS National Capit- al Region (NPS-NCR) outreach office in Washington, D.C., when the institution tapped retired Rear Adm. Moira N. Flanders to head the office. As NPS-NCR director, Flanders will be responsible for as- sessing the President, Provost and senior administration on special initiatives in developing, managing and coordinating the diversity of aca- demic activities and relationships in the nation’s capital.

“My primary responsibility is to professionally and positively promote the strategic importance of NPS education and research throughout the Department of the Navy, Department of Defense and U.S. federal government agencies,” said Flanders. “I hope to strengthen the existing Arenas Aces and create opportunities for new partnerships within the academic, research and international communities.”

The NPS is part of a larger program to develop partnerships and coordination with the White House, Congress, other federal agencies, and the UN as well as the needs of other international organizations.

Flanders was also an author, writing six of the chapters of “Combating Terror: A History of the War on Terrorism.” This book is great, he added. “This book is a comprehensive survey of cur - rent threats posed by terror - ists, sabotage and subversion...”

Professor Michael Glosny of NPS Department of National Security Affairs was one of a handful of authors as well, most of whom are instructors in CTFP.

“The value of the book is hav- ing all the important aspects of responding to terrorism in all places,” said Shemella. “In the book we don’t talk about the U.S. very much — we talk about all gov- ernments. We present the basics of combating terrorism strategy along with new theories and prac- tical tools governments can use in a very readable format.

“The specter of terrorism is everywhere and everyone must confront it. CTFP participants represent a cross-section of cooper- ating governments and positively promote the strategic importance of NPS education and research throughout the Department of the Navy, Department of Defense and U.S. federal government agencies,” said Flanders. “I hope to strengthen the existing Arenas Aces and create opportunities for new partnerships within the academic, research and international communities.”

The NPS is part of a larger program to develop partnerships and coordination with the White House, Congress, other federal agencies, and the UN as well as the needs of every student,” Hacker noted. “If you can succeed, it is very rewarding because you can see that everyone gets something out of the class, regardless of where they came from.”

Receiving promotion to As- sociate Professor and tenure are David Alderson from OR, Jomana Amara from the Defense Resources Management Institute, Araque from the Graduate School of Busi- ness and Public Policy and Michael Freeman from Defense Analysis. Receiving promotion to Professor and awarded tenure is James “Clay” Molz from National Security Af- fairs. Matthew Carley from OR and Christopher Frenzen from Ap- plied Mathematics will receive pro- motion to Professor, and Megan Quinn Kennedy from OR will re- ceive promotion to Senior Lecturer.
Postgraduate School's custom CubeSat axillary payload platform. NPS and the National Reconnaissance Office teamed up to develop small satellites will be stacked until they reach the desired destination.

world, hands-on space projects, such as CubeSats, helps keep us relevant explained Newman. “Giving students the opportunity to work on real-

potential for the future of CubeSat missions.

IN MANY WAYS, it will be a monumental launch for the Space Sys-
tems Academic Group (SSAG) at NPS. After a recent successful test run, two exciting NPS projects are scheduled to head to space in August of this year … One is a CubeSat, a small satellite destined for low-earth or-
bit, and the other, the NPS CubeSat Launcher or NPSCuL, is the payload platform that will carry it there.

NPS students and faculty, in a project funded by the National Re-
cognition Office (NRO), have designed and built the NPSCuL, pro-
nounced "NPS-cool," axillary payload platform to allow multiple Cube-
Sats to be launched aboard rockets as secondary payload — meaning the rocket would be able to carry satellites in onboard space that would otherwise be unused.

NPS Space Systems Professor Jim Newman noted the value of such an opportunity for NPS and NRO to collaborate on a project that has potential for the future of CubeSat missions.

“A fair number of the NPS Space Systems Engineering (SSE) students go to work at the NRO, ensuring that the Navy’s interests in space, in particular, and the DOD’s interests, in general, are well represented,” explained Newman. “Giving students the opportunity to work on real-world, hands-on space projects, such as CubeSats, helps keep us relevant and exposes students to learning beyond the classroom.”

The specially-designed NPSCuL is essentially a box into which the small satellites will be stacked until they reach the desired destination. At that point, spring-loaded doors will release the satellites one-by-one into orbit, where they will gather data for the duration of their one- to two-year lifespans.

“The CubeSat platform provides an opportunity to develop technolo-
gies that better serve our current military’s needs,” explained SSE Ph.D. student Wensheli Lan, one of two civilian graduate students working on the project. “The small size of a CubeSat, compared to a typical large satellite, lends itself to be more responsive and efficient, which are im-
portant advantages in the planning and operations of space programs.

NPSCuL, which can accommodate up to 24 CubeSats in a single ESPA-class [Secondary Payload Adapter] payload volume, enables these technologies to be developed at a much higher rate than any other U.S. launch capability to date,” she continued. “This inaugural flight of NPSCuL will provide more launch opportunities for the continually-
growing CubeSat community, which is estimated to include over 120 universities, private companies and government organizations.”

The August 2012 mission carrying 11 CubeSats is known as the Operationally Unique Technologies Satellite (OUTSat) and will enable NPS researchers to get one of their own CubeSats into space for the first time. That CubeSat is part of a collaborative effort between NPS and the Lawrence Livermore National Laboratory (LLNL), to gather proof-of-
concept data that is of significant importance to the space community. Known as STARE, the NPS/LLNL CubeSat will observe other satellites and help determine threats posed by space debris.

Space debris is a costly and dangerous problem for the space com-
munity, and one that the Navy and NASA have plenty of reasons to be concerned about. NPS Professor and Chair of the SSAG Rudy Panholzer explained that the Navy relies heavily on satellites for communications at sea. Space debris can be unpre-
dictable and can cause millions of dollars in dam-
gage if it collides with operational satellites in orbit.

STARE will help researchers look at ways of detect-
ing a potential collision early on so that the satellites operators have time to re-position the satellite out of harm’s way.

“The Navy is interested because they have a lot of assets in space which they rely on,” explained Panholzer. “And if we find ways of locating the space debris or space objects with a little more accuracy than they are do-
ing now, they can save a lot of money. Also, space debris creates more space debris. And it’s getting worse and worse. So unless we do something about it or do something to reduce space debris being generated in the future, it will get to the point where it’s very unsafe to go into space.”

Getting satellites into space can be costly and time-consuming, which has opened the door for CubeSats to gain momentum in the academic community. The small square satellites fit in the palm of your hand and, in many cases, can be built within the span of a student’s academic career.

SSE graduate student Vidur Kausshush has been working on NPSCuL since 2009, and is looking forward to seeing the final product ready for the August launch. He and Lan are proud to have the opportunity for something they worked on to make it into space. The hands-on compo-
nent of their program is something that both find exciting and unique.

“A lot of the hands on work has been done by us,” explained Kausshush. “We’ve actually built it up, tested it, made sure to incorporate any minor design changes that were required, and basically just pushed it forward to get it to the point where it can go to space. “In the past two and a half years,” he added, “I have been involved with designing, building and testing hardware, managing the budget and interfacing with the various external organizations that are involved in the first flight of NPSCuL.”

The NPS SSAG is adamant about student involvement, explained New-
man. From concept to launch to on-orbit operations, the objective is edu-
cating future aerospace engineers and operators, both military and civil-
ian, with an experience that prepares them for a career in the industry.

“Part of the educational value of working on NPSCuL is that our stu-
dents have the opportunity to interact with the real space community,” explained Newman. “They meet and work with professionals at United Launch Alliance, Boeing, the Space Test Program, the NRO, the National Research Lab, and others.”

Another educational opportunity can be found in the pressure of working with expensive equipment. Plenty can go wrong before and after the hardware makes it into space, explained Newman. “The parts are highly capable, and the equipment extensively tested to help reduce costly mishaps. He noted that the inevitable failures during ground test-
ning are used as learning opportunities, giving students the freedom to take calculated risks and be innovative thinkers.

“They get the hands on opportunity to work with real flight hardware. These parts are worth millions of dollars and you get to the point where you really can’t afford to make mistakes. So they also get to enjoy the stress of the real world.

"Although we are an educational institution, and education is our pri-
mary function, we are also trying to produce real hardware that will fly in space," he con-
tinued. "And that pressure of producing real flight hardware is actually a valuable part of their education. Both military and civilian stu-
dents are going to leave here as truly experienced space professionals."

For Kausshush, this project signifies more than just the culmination of years of hard work. He is proud to have the opportunity to have done something that not many people have.

"It’s been a lifelong dream to actually work with something that gets to fly in space," explained Kausshush. "To see that come to this point, where we are really close to a launch, is really exciting."
In his office at USSOCOM headquarters in Florida, Adm. William McRaven stands next to a few keepsakes collected throughout his career, vestiges that have left a lasting mark on his own motivations. A framed photograph pictures McRaven with, from right, President Barack Obama, retired Army General and current Director of the Central Intelligence Agency (CIA) David Petraeus, and U.S. Army Lt. Gen. Frank Helmick, current Director of the CIA’s National Clandestine Service (NCS). Perched over his shoulder stands a statue of General William “Wild Bill” Donovan. Tapped by President Franklin D. Roosevelt in 1941 to lead what would become the Office of Strategic Services (OSS), Donovan’s leadership of this organization would cement his stature as the “Father of American Intelligence.”

The OSS was the essential precursor to today’s Central Intelligence Agency, and set a path for the U.S. military’s inclusion of special operations forces. As he was “out for Operation Desert Storm/Desert Shield,” he noted, “But they set me up again, I came in fairly senior, and I was on my way after this tour to command,” he says. “I knew what I wanted to do when I got to PG school. Here was an opportunity to study, which I hadn’t had in my career at the time and I was looking forward to it.”

While he has been widely applauded for planning the May 2011 raid in Abbottabad that nabbed public enemy #1, NPS graduate and now Commander of the U.S. Special Operations Command (USSOCOM) Adm. William McRaven’s greatest contribution to Special Ops, and to American national security, may have actually been created by his pen nearly 20 years prior.

“In Review” bestowment. And were it not for a devastating 2001 puncturing accident, he likely still be out in the field, performing all those tactics that captured the public’s awe in “Act of Valor.”

McRaven has reluctantly become a celebrity of sorts, both within and beyond Department of Defense circles. It was his voice on the other end of the line briefing Commander in Chief Barack Obama and a spectrum of U.S. senior leadership when his plan to get Osama bin Laden, Operation Neptune Spear, was carried out by his team of elite commandos. He was runner-up for “TIME” magazine’s annual “Person of the Year” bestowedment. And were it not for a devastating 2001 puncturing accident, he likely still be out in the field, performing all those tactics that captured the public’s awe in “Act of Valor.”

But for all that he has accomplished in his lengthy Naval career, it was an opportunity to head to Monterey where he would perhaps end up making his most indelible mark on the forces he now commands, and on the nation. “The Bacc,” as he’s widely known around the U.S. Special Operations Command, or USSOCOM, headed over his shoulder stands a statue of General William J. “Wild Bill” Donovan. Tapped by President Franklin D. Roosevelt in 1941 to lead what would become the Office of Strategic Services (OSS), Donovan’s leadership of this organization would cement his stature as the “Father of American Intelligence.”

The OSS was the essential predecessor to today’s Central Intelligence Agency, and set a path for the U.S. military’s inclusion of special operations forces. And finally, also on this mantle rests a relic from the world to concepts like the “inverted pyramid” and “relative superiority.”

“Special Ops: Case Studies in Special Operations Warfare Theory and Practice” as it was aptly titled when finally published, was born from McRaven’s voluminous 612-page thesis, completed for his dual degree in 1993 from the Naval Postgraduate School. And it was an opportunity that McRaven freely credits as one of the most effective experiences of his career: “I think my time at the postgraduate school was invaluable, because it gave me the opportunity to think. The military trains you well, but rarely do you have time as an officer to do that critically thinking...to not be constrained by the pressures of a day-to-day job,” he said. “I am a strong believer that we need to teach our officers how to think critically, in a wide range of topics.”

“Have you to know your profession, and you have to be tactically and operationally sound and proficient,” he continued. “But as you get more senior, you have to have an education that teaches you critical thinking. You are going to use those skills more often as an officer than anything else.”

With that backdrop, then Cmdr. McRaven arrived on campus in 1991 as one of the more senior officers on campus, and says that he had nearly missed his opportunity to attend NPS. “I was actually one of the older students at the school at that time as a Navy O-5,” he said, who finally got to NPS on his fifth set of orders. He was in the operational pipeline, his first three sets of orders to the university would be canceled by the Navy, and the fourth by himself as he was “out for Operation Desert Storm/Desert Shield,” he noted. “But they set me up again, I came in fairly senior, and I was on my way after this tour to command,” he says. “I knew what I wanted to do when I got to PG school. Here was an opportunity to study, which I hadn’t had in my career at the time and I was looking forward to it.”

“I think my time at the postgraduate school was invaluable, because it gave me the opportunity to think.”

“To study,” as he puts it, would be something of an understatement for the overachiever that is McRaven, who by many accounts did indeed know exactly what he wanted to do during his two years at NPS, and it was more than study and reflection. “He definitely knew exactly what he wanted to accomplish while he was here, particularly in regard to his research,” said longtime Defense Analyst Professor Gordon McCormick, who served as second reader on McRaven’s well-known thesis.

CONTINUED ON PAGE 16 >
The roles of the United States Special Operations Forces in current conflict have increased dramatically over the past decade. In simple terms, like deployed man-years, current figures are double what they were at the turn of the millennium — in strategic terms, irregular warfare has truly become the norm.

With 2012 marking the 50th anniversary since President John F. Kennedy officially commissioned the U.S. Navy SEALs, and our focus on USSOCOM Adm. William McRaven, we examine the increasing role of Special Ops, and the subsequent evolution in our Defense Analysis department, the result of which McRaven began nearly two decades prior.

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"His thesis essentially challenged two tried and true historical principles of war… one, numbers count; and two, the defense is ‘superior’ to the offense," he added. "McRaven asked and answered the question, ‘If these historic principles of war are true, how can it be that a numerically inferior force, operating offensively, can consistently prevail?’ This is the ‘commando problem.’”

"This tried and true principles were treated as neat and untouchable doctrine of war before McRaven, and were first theorized in the 1800s by Carl von Clausewitz, a German military theorist whose ‘Vom Kriege’—translated as ‘On War’—has been widely noted as a foundational text in the strategy of warfare. Clausewitzian theories on conventional warfare talk about, among other things, mass of force, and the essential need for a larger defense, simply because defense is easier.

But, as McCormick noted, McRaven noticed some of these concepts were indeed quite counter to what he saw throughout modern warfare. ‘His thesis essentially challenged two tried and true principles of war,’ he continued. ‘I had felt very strongly going into that the principles of special operations were different than the principles of war.’

"Then Cmdr. McRaven focused on direct action operations very closely and in great detail,” noted current Defense Analysis department Chair Dr. John Arquilla. “He discussed how this small force, through acting swiftly and accurately… with speed, surprise, careful organization and planning, can create a relative superiority over an adversary, and he developed theory about this.”

McRaven examined these examples in great detail. “As I looked at each case study, it required a very detailed examination of the planning, the preparation, and the execution of each mission. As I was writing each one of the chapters, the theories began to manifest themselves in my mind. "Especially, I was trying to determine were the principles of special operations,” he continued. “I had feeling very strongly into this that the principles of special operations were different than the principles of war.”

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"Every day... from the time I left the school, it didn’t take me long to realize that what I had been taught—the concepts, the ways of examining problems—had been exceedingly valuable to me."

McRaven would end up analyzing only eight of those operations in the development of that theory. “I never got to the final two case studies, I just ran out of time. Had I done them, my thesis would have been 800 pages,” he noted with a laugh. “But I was doing it really just to educate myself. I wanted to do a good job, and I thought it was a valuable topic. But I just assumed that when I finished my thesis, it would simply sit on a shelf somewhere and collect dust.”

"Certainly that would not be the case for McRaven’s work, not immediately after it was completed, and not for the foreseeable future either. "For many decades to come, his thesis and the book that was born from it, will be the handbook for this type of special operations,” added Arquilla. “It had a profound impact… it’s pretty clear, the lessons to be drawn from this work are appreciated around the world.”

In spite of the impact of McRaven’s thesis, it is not the only mark he would leave on the Naval Postgraduate School. While he realized quickly there was a need in special operations theory, he also recognized a void in the education offered both to and about the craft he devoted his career to.

“I came to NPS in the National Security Affairs (NSA) curriculum, fantastic program… But we really didn’t have any classes on special operations,” he said. “I had just come off 10 months in Desert Storm/Dessert Shield, and I felt very strongly that we should educate our conventional force of officers coming through the Naval Postgraduate School, and our own SOF (Special Operations Forces) officers as well, on what special operations was all about… So I went to Tom Bruneau and we started pushing it.”

Distinguished Professor Tom Bruneau, still actively teaching in the NSA department at NPS, remembers McRaven well. “When he first got here, he was quite senior, and knew very well how the bureaucracy worked, how to get something done within the system. And he saw a real need for a program tailored to his community” said Bruneau, NSA Chair when McRaven pursued establishing the Special Operations Low Intensity Conflict, or SOLIC, curriculum. “In the end, he created something that would be of great benefit to all special operations forces.”

McRaven not only developed the SOLIC course outline required to graduate, he described in detail what the courses should entail, pitched the program to senior Naval leadership to get funding, and recruited top thinkers in the field to help make it happen. “We reached out to the Commandant of the Marine Corps, General (ret) Michael Hagee. We reached out to the RAND Corporation and Gordon McCormick, a very charismatic, wonderful teacher who was very interested in the same things I was. He agreed to help us,” McRaven said. McCormick would go on to chair the SOLIC curriculum, and the subsequent Defense Analysis department upon its creation in 2001 until Arquilla took over in 2011.

As current defense strategies have placed a greater emphasis on special operations, “It would seem the lasting effects of McRaven’s work, not immediately after it was completed, and not for the foreseeable future either. "For many decades to come, his thesis and the book that was born from it, will be the handbook for this type of special operations,” added Arquilla. “It had a profound impact… it’s pretty clear, the lessons to be drawn from this work are appreciated around the world.”

The increasingly strategic role of special operations in modern conflict was both welcomed, and perhaps fore-shadowed, in the eyes of William McRaven. “The recognition of SOF’s role in this war, and frankly how we will engage countries in the future, whether it is a hostile engagement, or a peaceful engagement… I know the President, the Secretary [of Defense] and others appreciate what special operations bring to the table.”

"On campus, those same programs are also equally well positioned to have a noted impact on current and future conflict. “Today there are two dozen wars going on around the world, and not one of them can be characterized by what we would call conventional warfare. They are all irregular,” Arquilla continued.

"The 21st century is very clearly one in which we use it to plan and execute that May ‘11 Operation Neptune Spear over the dimly lit skies of Abbottabad? Did the act of education have an impact on nature’s perfect creation? … From the time I left the school, it didn’t take me long to realize that what I had been taught—the concepts, the ways of examining problems—had been exceedingly valuable to me."
Vice Chief of Naval Operations Adm. Mark Ferguson delivers a Secretary of the Navy Guest Lecture to students, faculty and staff at his alma mater, the Naval Postgraduate School, Feb. 16.

By Amanda D. Stein

VICE CHIEF OF NAVY OPERATIONS OUTLINES THE FUTURE NAVY DURING SGL

Adm. Mark Ferguson, Vice Chief of Naval Operations, delivered the Secretary of the Navy Guest Lecture (SGL), Feb. 16, to grow into better leaders for the Navy’s future.

For the good of the Navy, the Marine Corps, and your service.”

Ferguson spoke about the Navy’s acquisition plans for the future, as well as the new defense strategy and planned rebalance of forces to the Western Pacific. He explained that the shift is supported by the Navy’s commitment to maintaining a global presence, and a result of the draw-down in Iraq and Afghanistan. He also noted that the shift in resources follows the guidance of the new Defense Department strategy.

“If you look at the budget decisions that we’ve made, the underlying force structure remains relatively unchanged for the Navy,” Ferguson explained. “We are at 285 ships today, by the time the end of this budget rolls around, we’ll have about 285. But the mix will change.”

“By 2017 we will be within one percent of what we are right now,” he noted regarding personnel. “There are 323,000 active duty in the Navy. Five years from now, our projected end strength is about 320,000.”

Ferguson praised today’s Sailors, noting that the retention rates and qualifications of the men and women of today’s Navy are the best they have ever been. He pointed to a 99 percent high school graduate rate and a 65 to 70 percent retention rate as evidence of the positive steps being taken to create a leaner, more capable force amid budget cuts.

“For you as leaders going forward, this is an important inflection point in your experience as a military officer,” explained Ferguson. “And it’s important because in the last 10 years, if you were to look at defense spending in both the base budget and supplemental spending, we’ve been on a steady upward road.”

“We’ve been engaged in two wars, the force is performing magnificently. It is resilient. It is tough. It is well trained. It is probably the most combat-ready force we’ve had,” he continued. “It’s under strain in some areas, under intense pressure in other areas, but it’s battle hardened, and it’s a very ready force. But this inflection that has taken place represents a shift in the trajectory of our budget that many of you in this room have never seen in your career. It will define the future that we come into in the next ten years.”

Following the SGL, Ferguson paid a surprise visit to the Trident Room in Herrmann Hall to present NPS Defense Analysis student Lt. Cmdr. Jonathan Fussell his fourth Bronze Star with Valor. Fussell was presented the award for his work as Troop Commander for Naval Special Warfare Development Group, where he led a joint and interagency task force on direct action missions in Afghanistan.

“While Capt. Poindexter and I had originally coordinated a very low profile presentation in the Trident Room, the Admiral’s presence was a welcomed addition,” said Fussell. “It was an honor to have him present with me the award. Having never seen me receive an award, my wife Rachel got a real kick out of it.”

Ferguson also met with NPS leadership to discuss the school’s impact on the Navy, and the programs that can ultimately help prepare students to lead in any number of critical areas of expertise. He noted in his lecture to students the importance of receiving an education in a collaborative environment, where problems solved today will have a lasting impact for the defense community in the years to come.

“The things you are doing now, in research and the laboratory, my prediction is that 15 years from now you will see them come to fruition. It will make you able to rise to those challenges in the future.”

“At 11:18 in the morning there was a thunderous explosion,” said Lippold as he described the moments of the attack. “You could feel all 505 feet and 8,400 tons of guided missile destroyer suddenly bow, flex, and thrust violently up and to the right.”

Lippold said that thanks to the training and determination of his crew, their command philosophy, and through crisis management, they were able to save the ship that day.

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Former Cole CO Provides Detailed Account of Aden Bombing

Retired Navy Cmdr. Kirk S. Lippold, former Commanding Officer (CO) of the USS Cole, opened up to Naval Postgraduate School students, faculty, staff and guests during an NPS Secretary of the Navy Guest Lecture, Apr. 3 in King Auditorium. Lippold was CO of the Cole when a suicide bomber attacked the ship on October 12, 2000 while refueling in the port of Aden, Yemen.

Lippold gave a shattering account of events that Fall morning when a routine refueling stop turned into a fight for survival that claimed the lives of 17 Sailors and injured 39 others.

“We train people to replicate, we educate to reason,” said Ferguson. “You are being educated to reason and to shape our future as we go forward. Your critical thinking and what you learn here will carry forward to your commands, into our laboratories, into the field. It’s going to be what shapes our future.”

Adm. Mark Ferguson
Vice Chief of Naval Operations
Computer Science (B8)

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Vice Chief of Naval Operations
Computer Science (B8)
A decommissioned U.S. Air Force A-10 Thunderbolt, similar to this operational aircraft from the 75th Expeditionary Fighter Squadron, is currently undergoing a complete renovation in preparation for its new life as a severe-weather chasing research vessel.

A-10 Transformation Will Lead to Big Research Opportunities for NPS
By Amanda D. Stein

AN OLD ‘HOG’

“T-28 Thunderbolt. We’ve done 15 years worth of missions with it. We’ve got good expertise, and we’re part of the DOD, so we can go into the military inventory and get these kinds of things ... the A-10 is just another example of that,” Bluth explained. “We get the A-10 from the Air Force through a concurrent agreement with Naval Air Systems Command and the Air Force. So it will still be an Air Force plane when we operate it, but it will be operated by the Naval Postgraduate School.”

The A-10 being loaned to NPS will undergo extensive renovations and development to make it fit for its new duties. The craft will first be completely renovated to take new condition in one of two A-10 maintenance centers in the country. It will be extensively refurbished, including new engines and wings, corrosion mediation, even a new paint job. From there, the A-10 will make its way to Oklahoma for testing and ‘weather-proofing’.

One of the biggest challenges that the aircraft will face is the danger that large hailstones pose to vulnerable areas on the plane itself, and the delicate sensors that will be attached to it. While the exterior of the plane is very durable, designed to take hits from 20 mm shells and remain airborne, certain components of the plane, such as the leading edges of the wings, are not as heavily armored. Thicker metal will have to be used to prevent ice build-up on the airframe, and a copper-de-icing system to prevent ice build-up. The only storm-penetrating aircraft available to them was retired then, “explained Jonsson. "The A-10 will be equipped with numerous sensors, from nose to tail, all running autonomously while the pilot navigates through storms. It will also have de-icing systems to prevent ice build-up on the airframe, and a copper-de-icing system to prevent ice build-up.”

“Since 2004, meteorologists have been lacking capability to obtain in situ measurements inside cumulonimbus clouds and thunderstorms. The only storm-penetrating aircraft available to them was retired then,” said Jonsson. “Much progress has taken place in the development of remote sensors and models that are used to observe and predict storm development. Both, however, need the in situ data for tuning retrievals and validate results.

Additionally, atmospheric chemists need to measure quantities of chemical species that are generated by lightning inside storms, or modified by the cloud chemistry,” he continued. “They also want to study the transport of chemicals through the heights of the troposphere and into the stratosphere. Atmospheric physicists are still working on the causes of cloud electrification and lightning.”

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It’s a niche field. There are not a lot of people who get into atmospheric science. But for the people that do, everybody will know that this is the place to come.”

Bob Bluth, Director Center for Interdisciplinary Remotely-Piloted Aircraft Studies

"It’s a niche field. There are not a lot of people who get into atmospheric science. But for the people that do, everybody will know that this is the place to come.” explained Bluth. “Since we are a University-National Oceanographic Laboratory System facility, we work with a lot of other universities. That gives NPS and the faculty and students at both institutions an opportunity to work together. And there are dozens of universities that we have worked with, providing a national, even international, level of exposure.”
The New Face of ISR

As a cohort of students reaches the midway point in their remote sensing intelligence master’s program, they serve as a compelling example of the unique educational programs in highly-classified fields that only the Naval Postgraduate School can provide.

THE NAVAL POSTGRADUATE SCHOOL celebrated a new addition to the academic lineup as 20 students in the Remote Sensing Intelligence (RSI) master’s degree program recently completed their second quarter of classes. With two more quarters to go, the fast-paced program provides students with a comprehensive education in remote sensing, and prepares them for jobs in critical national security fields with one of several potential sponsor organizations after they graduate in the winter.

“Remote sensing means taking images from a distance,” explained Physics Professor Richard Olsen, one of the key faculty facilitating the RSI program.

“Satellite imaging of one kind or another — optical, infrared, radar — those are sort of the cornerstone technologies that comprise remote sensing. It has to do with obtaining information about something at a distance without interacting with it directly.

“It optimizes your ability to conduct warfare,” he continued. “Because the more information you have about where you are going and what’s there, the more effective you can be. Mission planning, absolutely, requires the type of work we are doing. "Remote sensing optimizes your ability to conduct warfare, because the more information you have about where you are going and what’s there, the more effective you can be."

— Dr. Richard Olsen
Professor of Physics

Remote sensing technology that the area they were going into, there were already people there. The British troops would have been killed if they had not been warned about the presence of these forces.”

The RSI program has incorporated a significant number of new courses designed specifically to meet the needs of the intelligence community to which the students will be transitioning after graduation. Olsen has taken feedback from faculty on what areas of study are important, and developed a curriculum that he feels touches on the important aspects of the field.

Without having previously been government employees, the RPS environment is a new and exciting one for many of the students. RSI student Christopher Burt knew of NPS’ academic reputation before he joined the cohort, and he sees the program as a unique opportunity to merge the perspectives of military and civilians.

“Having people trained in the civilian world as scientists — and with a lot of us having extensive commercial experience too — I think you get a new and fresh perspective on the scientific world,” said Burt. “Adding that to the expertise of the military men and women in the DOD can only help.

“Remote sensing is an invaluable tool for gathering intelligence, and one that the defense community has seen the value of. "The main benefit of being at NPS is the relevance of the classes while building the body of knowledge about the science," explained Terry. “This education will provide us the background information to go into the intelligence community and contribute to solving their geospatial problems.”

Olsen is pleased with the interest in the program, and hopes to add some Army students to future cohorts, giving some of the end users a chance to study remote sensing and the technology that will be utilized by soldiers in theater. Olsen noted that there are few universities currently offering remote sensing programs, and even fewer — if any — have the access to Sensitive Compartmented Information Facilities (SCIF) and faculty with the clearance to teach classified material.

“We think there is a tremendous hunger for this program at the student level,” he noted. “I’m expecting that we will probably have four or five times more applicants than we will accept this year. And I think there is a tremendous hunger out there in the employment community as well.”
Manager Meghan Rasmussen explained that faculty and staff in the Center on Contemporary Conflict (CCC) are now home to the Project on Advanced Systems and Concepts for Countering Weapons of Mass Destruction (PASCC), a multi-million dollar program directing research and strategic dialogues on weapons of mass destruction (WMD) on behalf of the Defense Threat Reduction Agency (DTRA). CCC has assumed these functions from the former Office for Advanced Systems and Concepts (ASCO), which was disestablished in June 2011. "The core function of what ASCO did, and what PASCC now does, is to try to anticipate and analyze ways in which the United States can help itself and its allies manage and reduce the threat from weapons of mass destruction," explained Dr. Anne Clunan, Director of the CCC and Associate Professor in the Department of National Security Affairs (NSA).

The relationship between DTRA and CCC was initiated by former NPS faculty member Peter Lavoy, the current Principal Deputy Assistant Secretary of Defense for Asian and Pacific Security Affairs in the Office of the Under Secretary of Defense. Over a period of 12 years, Lavoy and other NSA faculty members helped NPS build a relationship with DTRA. As the relationship evolved, DTRA began to understand that NPS and its CCC were institutions capable of furthering WMD research and unclassified diplomacy.

The PASCC was launched at NPS in June of 2011, with a call for proposals quickly bringing innovative projects into view. CCC Program Manager Meghan Rasmussen explained that faculty and staff in the center were well prepared to handle the transition, and saw the program as an opportunity for NPS to help further an area of national security already being extensively studied by university researchers and students. "Although PASCC is still fairly new, it demonstrates our capacity to manage these large and complex efforts," explained Rasmussen. "We are working on expanding the way we release research products to quickly and efficiently get results out to the public so that other researchers can leverage them, while also working with stakeholders in Washington to share our research agenda."

One of the primary functions of PASCC is to distribute millions of dollars in grants to qualifying research proposals and engage in strategic engagement with key global partners. "The project fits very well with the expertise of the CCC faculty, and the National Security Affairs department faculty, in that we have a very deep bench of folks who are focused on WMD, strategic stability and extended deterrence issues and they also have very deep regional expertise," explained Clunan. "And that is not something found at a lot of major research universities."

I think that this will be a growing opportunity for NPS as the definition of what is a weapon of mass destruction or mass effect will change as technology changes," she continued. "And this enables the university to be where it should be — which is on the cutting edge of research that is relevant to the nation’s security."
the strategic advantage of NPS’ international environment. Today’s global problems require very comprehensive approaches and solutions that bring their own elements of national and international power, he said.

He closed by remarking, “You have bonds of friendship and trust already in place that you forged here in Monterey. You became international strategic thinkers without even realizing it.” Richardson said: “Our nation needs you to rise and reach your strategic potential … Don’t forget what you learned here in class and by all means stay in touch and keep those strategic bonds strong.”

Following the graduation ceremony, distinguished guests and graduates alike transitioned to Herrmann Hall’s Barbara McNitt Ballroom for the graduation reception. Here, Richardson commented that he felt it was a privilege to be asked to be the graduation speaker.

“When President Oliver asked me, I was completely thrilled,” he said. “Anytime I can be the speaker at a graduation ceremony here, I’ll take it.

“NPS itself is a strategic star in our constellation as a Navy and the combination of Navy students, students from other services and government agencies, and of course the international students, make this truly a special place,” he added.

As is the tradition every quarter, several key students were spotlighted for excellence through NPS’ various awards and honors. One of the most prestigious, the Monterey Council Navy League Award for Highest Academic Achievement, was presented to Navy Lt. Eric J. Blomberg.

“Anytime I can be the speaker at a graduation ceremony here, I’ll take it. ‘I am blown away by my selection for the Navy League award,’ Blomberg said. “As a nuclear engineer in the Navy, the curriculum in the National Security Affairs department was well outside of what I have worked with and studied for the last 15 years, and I really enjoyed the experience … I will go back to the fleet as a more well rounded officer,” he added.

Lt. Cmdr. Meng Hwee Tan of the Singaporean Navy was selected to receive NPS’ top award for international students.

“I am very honored to receive the Outstanding Academic Achievement Award for International Students. The award is a recognition of my hard work and effort put in over the past 18 months. I would like to thank the MAE (Mechanical and Aerospace Engineering) department for the award nomination.

“Receiving higher education at NPS was a very enriching experience. NPS provided the opportunities to work on real problems and issues related to military aspects,” he continued. “The opportunity to interact with U.S. students as well as other international students has widened my knowledge and network.”

Tan added that he enjoyed the pace of life in Monterey, saying he would definitely miss it upon returning home to Singapore.

Part of the graduating class also included something of a rarity in NPS’ commencements, as Navy Capt. Bryan S. Lopez, Executive Officer (XO) of Space and Naval Warfare Systems Center Pacific, walked with this quarter’s class to receive his Executive Master of Business Administration (EMBA) degree.

“I feel humbled to have been part of the experience, and to be able to come back and do this and be part of the Executive MBA, it is phenomenal,” he said.

Lopez was already familiar with NPS, graduating from the university as a Lt. a decade prior with a master’s degree in Electrical Engineering. He had high praise for the experience, noting that the Executive MBA was a perfect fit to the type of work he performs daily as the XO at a major Naval systems center.

“It’s all about operational procurement, money, manpower and cost schedule type of performance stuff … This will continue to help me with whatever I do in the rest of my career,” he said. “At this point in my career, I’m not sitting down there working with engineering design teams. You’re managing the big picture. It’s budget, money and manpower, and if there’s a follow on tour in Washington, that’s where most of us end up some day,” he remarked.

And in spite of the unique experience Lopez’ second time around at NPS provided, he admits the campus also brought back some old memories. “It is nostalgic to be here 10 years later, as I remember being here as a Lt. and standing outside Root Hall … standing here again, it is just like a flashback,” he added.

A total of 307 students graduated during the Winter quarter, earning 308 degrees. The graduating class was composed of 196 military, 81 civilians and 30 international students.
Revolution Visualized

More than a year has passed since the Arab Spring washed over northern Africa and the Middle East, and so many nations that were once enthralled with the angst of revolution still teeter in a delicate balance between societal security and the unknown.

Egypt was certainly in the eye of the world during this ongoing storm of change. Revolution has happened many times before in human history, but not quite like this. Before former Egyptian President Hosni Mubarak resigned on February 11, 2011, Egyptian citizens, media, officials and impersonators used everyday social media platforms to ignite and share, to organize and mislead. Unlike any revolution that had come before it, the interconnections made through modern technologies were very clearly impacting society in new ways.

In the Common Operational Research Environment (CORE) laboratory at the Naval Postgraduate School, social network analysis tells compelling stories … It highlights potential improvised explosive device networks in Afghanistan, and can be applied to anti-gang initiatives on the streets of American cities.

Researchers in the CORE Lab examined a million Tweets posted over the span of 11 days just prior to Mubarak’s resignation all related to Egypt, and painted a picture of how they connected together. They recognized who the major players were within and outside of Cairo, and how they connected via Twitter — in short, they created a picture of revolution, and the role of social media within it.

Scholars will disagree to the day regarding the power of that role … but there is one truth that is undeniable. Like no revolution before it, the Arab Spring demonstrated how 140 characters can be used to change the world.