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NAVAL POSTGRADUATE SCHOOL COMMITTEE ON THE FUTURE

ENVIRONMENTAL SCAN SEPTEMBER 2011

“Finding innovative solutions to many of the greatest challenges facing the nation and the world in the 21st century will depend upon having a highly-skilled workforce.”

The Path Forward: The Future of Graduate Education in the United States
Commission on the Future (CoF) of Graduate Education in the United States

The purpose of the NPS Committee on the Future is to set the stage and provide the foundation for the strategic planning process. To best inform this process in higher education, an environmental scan is created as the initial tool in the discovery process and in building the Committee’s final report.

Note: This report is divided into two sections: Higher Education and Department of Defense

ACCOUNTABILITY: HIGHER EDUCATION

Observations

A requisite step to gaining strong political and financial support — from the federal government, the state and the business community — is higher education’s demonstrated commitment to using funds in responsible ways to foster effective learning and to fulfill the educational purposes that constitute the basis for public and private support. Base funding, for the most part, has little relation to explicit educational goals...a more effective strategy to optimize learning is one that links dollars to the achievement of desired results. [NCPPE]

Increased funding is not likely to happen until universities and colleges demonstrate their ability to achieve desired results in effective and efficient ways. [NCPPE]

Our Thoughts

- There is no more telling sign of accountability than a demonstrated commitment to measure results and to use feedback to improve performance. [NCPPE]
- A core element of any successful program to optimize learning is a commitment to define the markers of progress, and to measure results according to the criteria that have meaning and support both inside and outside higher education. [NCPPE]

- In conjunction with a range of other stakeholders, universities and colleges must create a stronger sense that meeting the educational needs of the 21st century is essential for the nation's continued vitality. [NCPPE]
- States not only don't gather much information on learning, when they do, what they collect is often not available in a form that can be used to answer the questions most frequently posed by the public. [SCUP]
- In negotiations over regulations regarding accreditation, language that guarded the ability of institutions to set their own standards for student success was maintained. [SCUP]

DEMOGRAPHICS: HIGHER EDUCATION

Observations

Global demographics and economics, not birthrates, have become the driver for higher education. [SCUP]

Demographic trends: a large group of US workers will soon retire; the knowledge economy is based on creating, evaluating and trading information and knowledge; predictions are that the US economy will be bifurcated, split between service and knowledge related areas. [CoF]

Trends in graduate enrollment: demographic changes are tied to less education, lower math and reading skills; non-traditional students (single at a later age, returning after being in the workforce), and employer-related benefits such as part-time work, educational assistance. [CoF]
[CoF]

Distance education has proved more effective for students than face-to-face. [SCUP]

Increased enrollments in virtually all types of institutions particularly in those regions with high unemployment, is likely to persist. [SCUP]

It is predicted that student enrollment for those age 25 and older will increase at a higher rate than traditional-age students through at least 2015. [SCUP]

Our Thoughts

- The nation's transition to a knowledge-based economy has effectively eliminated many manufacturing jobs that once offered middle-class lifestyles without a college degree. Now, attaining a lifetime of self-fulfillment, civic engagement, and economic productivity requires a college education. [NCPPE]
- Systematic data collection should be undertaken to help address the challenges facing US graduate education. Studies should include understanding aspirations and creating career pathways for students, the nation's need in its future workforce, humanities in the 21st century economy, and how graduate education is preparing future scholars and leaders. [CoF]

ECONOMIC FACTORS: HIGHER EDUCATION

Observations

The jobless recovery is predicted to continue for at least five years. [SCUP]

Changes in federal funding should help students and parents looking to institutions and lenders to help fill the gaps from state-sponsored programs, but those are unlikely to meet either needs or the goals set by the administration. [SCUP]

The chief funder of higher education in the US is the government; aid increased 82% between 1996-2007, but federal aid portion of the total funds used declined from 66% to 58%. 74% of master's level and 86% of doctoral students receive some kind of financial aid. Almost half of graduate deans in 2009 reported that student financing is one of the most critical issues they face. [CoF]

According to the National Center for Public Policy and Higher Education, over the past 25 years, average college tuition and fees have risen by 440% - more than four times the rate of inflation and twice the rate of health care costs. Tuition and fees at private colleges rose at the lowest rate in 27 years (4.3%), but are still higher than the CPI, which was 3.8% in 2008. [SCUP]

Community colleges have been hit the hardest and have been very creative about when they offer courses (all night long) and even who pays for them (anyone who is willing to donate to support a course). [SCUP]

Space management is becoming a key area of concern: no one wants the continuing operational costs of new construction. [SCUP]

The Commission on the Future: University of California Berkeley working group reported that over the last 40 years, the state budget for higher education has dropped from 13.4% to 5.9%. In inflation-adjusted dollars, the state contributed \$16,430 to the cost of an education for each UC general campus student in 1990, but this year it will contribute \$7,570 – a 50% reduction. Without corrective action, California is projected to face a budget gap of nearly \$20 billion in FY 2010-2011. The working group recommended examination of these potential strategies to address the institution's funding gap: funding mix, enrollment levels, enrollment mix; administrative inefficiencies; post employment benefit restructuring; faculty mix; educational delivery; financial aid policy; research cost recovery; private partnerships.

The Commission on the Future: University of California Berkeley working group recommends that the institution develop a multi-year advocacy campaign aimed at grass-roots opinion from leaders throughout the state of California to foster public and political support for the university as a major priority for state funding; improve indirect cost recovery rates with federal agencies; revise its practices and policies on charging indirect cost recovery for non-federally funded research; generate new revenue to protect academic quality and strengthen university planning; examine alternate faculty compensation plans; and allow for the possibility of charging differential tuition by campus, as a means of mitigating potential future enrollment impacts on some campuses.

Our Thoughts

- The Higher Education Price Index (HEPI) as well as tuition, continues to outpace the Consumer Price Index (CPI) even though it dropped from 5% to 2.3%. Some are asking if higher education will be the next ‘bubble’ to burst. [SCUP]
- Beginning with \$2 billion in 2011, a new federal program to support doctoral education associated with areas of national need identified by the administration should be authorized, and provide direct student support of \$30,000 stipends for tuition and fees, and other ancillary costs for a total of \$80,000 per student per year. Students would be eligible for 5 years of support. By FY2016, \$10 billion could accommodate 125,000. Funds would be provided based on proposals submitted by universities for graduate programs to support doctoral students in key areas, tied directly to a national effort to develop the US domestic talent pool, particularly in the face of uncertainties of continued participation of international students in US doctoral programs. [CoF]

ENVIRONMENTAL FACTORS: HIGHER EDUCATION

Observations

The US and China now account for some 40% of the world’s emissions: China is the world’s top emitter of greenhouse gases. Coal comprises 76% of China’s primary energy production; oil – 13%; renewable energy – 8%; the country’s nuclear power capacity will increase ten-fold to 86 gigawatts; over half of China’s shallow groundwater is contaminated and it has 7 of the 10 most polluted cities. China incinerates its waste, creating toxic emissions that fall across the world. [SCUP]

Purchased electricity is by far the largest contributor to greenhouse gas emissions at campuses that are part of the American College and University Presidents Climate Commitment group. [SCUP]

Increasingly, technology is contributing to greenhouse gas emissions across the world: 2% of the global atmospheric carbon emissions can be traced to the information technology industry. The incentives to focus on the energy costs of IT will likely increase if carbon emissions are taxed and can be expected as the cost of energy rises with economic recovery. [SCUP]

Our Thoughts

- The cost to institutions of technology intensive research and teaching offers a clear target of opportunity for reducing energy use, if the campus has an energy management strategy in place. In a recent survey, only 36% of campuses had one. [SCUP]
- By 2011, data centers are expected to spend \$1 on power and cooling for every \$1 they spend on hardware. [SCUP]
- IT departments are not focusing on their data centers; instead, they are looking to migrate LCD monitors, get employees to shut down equipment, and buying ENERGY STAR equipment. [SCUP]
- The tendency to locate servers near those who have data on them, rather than in a centralized location or virtualized has contributed to inefficiencies. [SCUP]

GLOBAL EDUCATION ENVIRONMENT: HIGHER EDUCATION

Observations

At the first United Nations Educational, Scientific and Cultural Organization World Conference on Higher Education in 1998, there were about 100 million students enrolled in postsecondary education around the world. At the same conference held in 2009, it was estimated that there are close to 150 million. [SCUP]

The US has a 75% high school enrollment rate, despite the fact that we spend more per pupil than any other country. Hungary, Japan, Finland, France, Germany, Italy, Poland, the Slovak Republic and Sweden all graduate more than the US. All of these countries have increasing proportions of student seeking post-secondary educations, a trend not in the US. [CoF]

Europe, China, and India are investing heavily in graduate education. Europe already produces more doctorates in science and engineering than the US. [CoF]

The Wall Street Journal just awarded the top 3 rankings to European schools and 6 out of the top 10 accelerated MBA programs to non-US graduate programs. [CoF]

Just 60% of 4-year US college students graduate. In the US, 40% of students who begin doctoral programs do not finish them, and many take 8-10 years to obtain their degrees. [CoF]

International doctoral and research students comprise 24% of the total US graduate population, well above the worldwide average of 19%. This is due to English as the primary language for academic discourse, international trade, economic prospects, gateway to citizenships and employment in the US, worldwide credibility of a US graduate degree, and lack of available seats for graduate education (especially Asia) in a student's home country. [CoF]

The EU has established common standards to promote mobility in higher education: in 2000, the EU had the largest number of international students in higher education, both graduate and undergraduate. [CoF]

In a recent EU survey, 5 out 6 respondents said that the *quality of a higher education institution* would help them decide where to study. [CoF]

China's Ministry of Education is supporting the recruitment of 2,000 foreign science and engineering researchers and providing support for 5,000 of its best graduate students to study abroad. [SCUP]

Between 1998 and 2005, the number of students enrolled in tertiary education in China rose to 15.6 million – close to the numbers found in the US and the European Union. [SCUP]

China continues to sign agreements with institutions around the world to advance its agenda of 'soft power.' [SCUP]

China now ranks as the seventh most popular destination for Americans studying abroad. [SCUP]

Countries that increased the rate of attendance at primary and secondary schools are now facing a shortage of places at their state-supported institutions of higher education that is unlikely to be met by traditional face-to-face instruction. [SCUP]

The growth in enrollment in private higher education to 30% of all enrollments has created uneven access and quality and remains a concern of many higher education leaders. [SCUP]

The explosion in tertiary enrollments has put a strain on the key principles of publicly supported higher education — access, affordability and quality — particularly for developing nations. [CoF]

The European Higher Education Area has already started graduating students with three-year bachelor's degrees that have tackled learning outcomes head-on. Politicians in the US are wondering why higher education hasn't also moved to the European three-year model here. [SCUP]

Since 2004, China now has some 330 Confucius Institutes for cultural awareness operating in universities in more than 80 countries. China is also establishing Chinese Teacher Training Centers to help universities teach Mandarin and collaborate on research within mainstream university programs. [SCUP]

While global tertiary education leaders focused on how to deliver opportunity across the world, rankings continue to drive investments in research, not in access. The European Commission on Education has funded a project to create a global university ranking system to rival those of China's Shanghai Jiao Tong University and the UK's QS-Times Higher Education. [SCUP]

Our Thoughts

- Remaining competitive in a global economy increasingly requires workers who are more productive and resilient than in earlier times; they must be learners for life, capable of returning to higher education to retool for changes occurring in the knowledge base and skill requirements. [NCPPE]

GRADUATE EDUCATION ENVIRONMENT: HIGHER EDUCATION

Observations

A graduate education will soon become the minimal education credential that high-skills employers require. Between 2008-2018, it is expected that about 2.5 million new jobs will require a graduate degree. [CoF]

US census data from 2000-2006 reflect that overall enrollment in colleges and graduate schools increased from 15.3 million to 17.2 million; bachelor's degrees increased since the early 1980s from 1.2 million to 1.5 million; however, these numbers haven't kept up with the general population of individuals of college age. [CoF]

Women account for 50% of graduate students, and fields of study remain education, health sciences, and public administration; only 33% in physical sciences and 25% in engineering. Women represent 50% enrollments in medicine and law. [CoF]

Since 1998, a 4% increase in all minority groups enrolling in graduate school, while non-Hispanic white student enrollments stayed flat. [CoF]

Growth isn't uniform across all fields: science and engineering declined in the 1990s. [CoF]

Blacks and Hispanics do not aspire to get graduate degrees in comparison to whites (41%) and Asians (50%). [CoF]

In 1977, 82% of doctoral degrees awarded in the US were granted to US citizens, but in 2007, it was 57%, and in the physical sciences it was 42%, down from 75% in 1977. In 2007, in engineering more than 50% and in physical sciences, just under 50% of graduate and doctoral students in US institutions are international. [CoF]

The US share of world college students dropped from 29% in 1970 to 12% in 2006. [SCUP]

In 2007: 64,607 master degrees and 60,616 doctoral degrees were awarded. [CoF]

Our Thoughts

- The aging workforce needs to be replaced: employers should establish endowed graduate school chairs, promote lifelong learning, provide tuition reimbursement programs for graduate study, replicate established programs that address challenges facing underrepresented groups, create industry-sponsored graduate fellowship programs and special incentives for small businesses to develop talent, collaborate with universities to clarify entry points into careers, provide internships and work study opportunities for graduate students. [CoF]
- A major investment in graduate education is required to prevent serious decline in our nation; broadening participation in graduate education and in the US workforce is and should remain a national priority and a key strategy in increasing the number of advanced degree holders. [CoF]

INFORMATION TECHNOLOGY: HIGHER EDUCATION

Observations

From 2005 through 2007, there were slightly less than 3000 security breaches at universities and colleges. The most common form of security breach was unauthorized access from individuals within the institution's system; second, the result of accidental online exposure; third, stolen laptops. [SCUP]

In 2007, 49% of the data breaches on US campuses were the result of lost or stolen (unencrypted) laptops and portable media. [SCUP]

Members of the Information Association for Information Communications Technology Professionals in Higher Education (ACUTA) reported that half the respondents in a survey of computer officials in higher education revealed that their campuses had suffered a security breach in the last year. [SCUP]

Cybersecurity is part of the national security system: the federal government is piloting an expansion of digital identity verification via the OpenID Foundation and the Information Card Foundation. Institutions may have even more reasons to outsource their e-mail and other functions, as Google is a vendor partner, along with Yahoo, PayPal, Equifax, AOL, and others. [SCUP]

The largest share of the IT budget goes to hardware, regardless of the size of the campus. [SCUP]

EDUCAUSE's annual survey of IT issues found "funding IT" to be the number one concern of higher education IT executives. [SCUP]

Broadband speed remains a problem throughout the US, which ranks 28th in the world. [SCUP]

Our Thoughts

- Finding ways to change the behavior of faculty, staff and students is critical to securing data and identity. Even with the help of higher level security programs, people on campus are the ones most likely to introduce viruses, botnets and other alien programs into a campus system. [SCUP]
- The increase in technology spending on campuses is predicted to slow to only 1-2% through 2013; most of the rest of the campus is facing decreases.
- Library and computing services will move even more closely together, with the increased acceptance and availability of e-books. [SCUP]
- The ability of IT executives to effectively influence planning could be the most important task ahead in the ever-expanding portfolio of expectations for technology. [SCUP]

POLICY: HIGHER EDUCATION

Observations

The past three decades have witnessed a decreased willingness to make public policy a key lever for engaging higher education institutions in addressing public purposes. In place of major policy initiatives and accompanying financial support to address commonly defined public challenges, state and federal governments have been more inclined to take as an article of faith that higher education institutions will serve the public well-being through the pursuit of their own self-interests. [NCPPE]

The tendency is to conceive of higher education as simply an engine of economic development in itself, rather than as an instrument for increasing economic and social well-being through the educational results it produces: The challenge for the years ahead is to achieve a public policy in an era of diminished public purposes. [NCPPE]

The Higher Education Opportunity Act of 2008 requires institutions to post a 'net price calculator' on their web sites by 2011. Not yet mandated, but clearly something the US Department of Education desires, is an equivalent indicator of post-baccalaureate placement rates. [SCUP]

Our Thoughts

- Government support should remain for existing programs and initiatives for federal graduate training fellowship programs and loan forgiveness for graduate students in priority fields (master and doctoral). [CoF]
- Amended tax policies for graduate fellowships and scholarships and federal and state research and graduate education grant programs should be aligned. [CoF]
- A new visa category should be implemented international students who receive doctorates in US institutions. [CoF]
- Federal funding should support collaborative degree programs with universities abroad, especially in strategically critical countries. [CoF]
- The federal government should authorize a new federal competitive grant program across agencies to build capacity, based on the university's new master's program or reinvigoration of existing programs, including professional master's programs. [CoF]
- Combined with the development of standards, the federal administration is moving its educational change agenda through state legislatures and systems, rather than through federal law. Will it use the same tactics for reform in higher education? [SCUP]

TEACHING/LEARNING AND RESEARCH-RELATED ISSUES: HIGHER EDUCATION

Observations

The central issue in doctoral education in the US is the failure to obtain a degree/attrition; the overall range is from 40% to 50%; fellowships have a 25% dropout rate. The main factors were relationships between student and advisor/faculty and student involvement in program or institutionalized activities, and length of time-to-degree. [CoF]

Research on the learning outcomes of online education has demonstrated that it is at least the equivalent, if not better, than the outcomes of just face-to-face courses. Blended learning provides the greatest benefits of all. Another meta-analysis found that the primary effects of increased learning result from the greater amounts of time that online students spend engaging the course content and with the instructor. [SCUP]

A Bill & Melinda Gates Foundation study of the effects of smaller class size in the LA Unified School District reinforces the finding that it's the teacher that makes the difference in learning, not the number of students. [SCUP]

A recent survey of members of the Association of American Colleges and Universities (AAC&U) found that only 5% of chief academic officers responding thought 'all students' understood the intended learning outcomes of the institutions, and only 37% thought that of the 'majority of students.' [SCUP]

Assessment of a “common set of intended learning outcomes” for all undergraduates was reported by 78% of the AAC&U survey respondents, but few use any common assessment tools or methods beyond capstone courses. [SCUP]

An annual survey of K-12 students administrators, teachers and parents found that the largest digital disconnect is between what students are learning and living outside of school, and the technology they work with in school. [SCUP]

Potential students are confused by industry about what skills and knowledge employers want most from graduates: recent studies show that 5 skills are highly important: professionalism/work ethic; oral and written communications; teamwork/collaboration; critical thinking/problem-solving; and ethics/social responsibility. [CoF]

The Commission on the Future: University of California Berkeley working group recommends that the institution prioritize internal funds to support world-class research in disciplines where extramural funding options are limited; motivate the development of large-scale interdisciplinary collaborative research projects to capture new funding streams; create multi-campus, interdisciplinary “UC Grand Challenge Research Initiatives” to realize the enormous potential of UC’s ten campuses and three national laboratories; streamline risk management practices to increase the efficiency of the research enterprise; proactively demonstrate the significant and long-lasting benefits that UC research provides the state and the nation, and advocate at the national level for increased and sustained investment in research.

Our Thoughts

- Institutions should adopt policies and practices designed to transform our society, conduct inspired research that has purpose and impact for the local community, the state or the nation; research should be balanced by equal emphasis on fundamental and applied research, the source of countless innovative discoveries. Pathways need to be clarified for graduate students by providing appropriate training and mentoring; faculty need to be prepared to face the future as educators and researchers; programs to identify talents undergraduate students should be established and expanded; professional development programs should be implemented for graduate students; and underrepresented students should be developed into outstanding role models and leaders. [CoF]
- To optimize learning entails an increased sense of responsibility – within the nation at large, its individual states, and in public and private institutions of higher education — to achieve learning outcomes and to meet educational standards that address growing societal needs. [NCPPE]
- A key challenge in creating partnerships to optimize learning is to encourage a kind of thinking and dialogue among a range of stakeholders that makes innovation possible. Business leaders need to be a voice at the table in considering ways to provide a broader range of citizens with the education and training to be competitive in a rapidly evolving global economy. [NCPPE]
- E-portfolios offer an assessment option that can be cut across formal, informal and occupational learning; the methodology requires increased trust and valid rubrics. An AAC&U survey revealed that 57% of respondents’ colleges were using e-portfolios in some way, but only 42% were using them as part of their assessment efforts. [SCUP]

- E-portfolios have not gained significant acceptance in much of the corporate world; certifications and credentials already in existence, include ones that rely on standardized testing from ACT, are preferred. [SCUP]

NAVAL POSTGRADUATE SCHOOL COMMITTEE ON THE FUTURE

ENVIRONMENTAL SCAN
SEPTEMBER 2011

“We do more than just respond; we prevent. In our Maritime Strategy we state that we believe that it is just as important to prevent wars as it is to win wars. That is done through our worldwide presence, our well-trained Sailors, and our very capable ships, airplanes, and submarines.”

Admiral Gary Roughead, USN
Naval Operations Concept (NOC) 2010

GRADUATE EDUCATION: DEPARTMENT OF DEFENSE

Observations

Neither the United States Naval War College and Army War College offers graduate degrees; the Air Force Institute of Technology offers graduate degrees through their Graduate School of Engineering and Management. [www.usnwc.edu and www.carlisle.army.mil]

The National Defense University (NDU), with facilities in Washington, D.C. and in Norfolk, VA., is an accredited graduate-level university. Every year, more than 550 masters’ degrees are awarded to students who complete studies at the National War College, the College of International Security Affairs, Industrial College of the Armed Forces, and the Joint Advanced Warfighting School. Through agreements with a number of other universities, students of the Information Resources Management College can earn 15 graduate credits for work completed at NDU. The Joint Forces Staff College has educational partnerships with 13 local colleges and universities, and those available near combatant commands, which allow transfer of up to 15 graduate credits for work completed. [<http://www.ndu.edu/colleges.cfm>]

Our Thoughts

- The Naval Postgraduate School is the primary graduate educational institution for the Department of Defense.

MILITARY STRATEGIES: DEPARTMENT OF DEFENSE

Observations

The mission of the Department of Defense is to protect the American people and to advance our nation’s interests. [*QDR, National Defense Strategy, National Security Strategy, National Military Strategy*]

The *Quadrennial Defense Review 2010* advances two clear directives: to further rebalance the capabilities of America's Armed Forces to prevail in today's wars while building the capabilities needed to deal with future threats and to further reform the Department's institutions and processes to better support the urgent needs of the warfighter; to buy weapons that are usable, affordable and truly needed; and to ensure that taxpayer dollars are spent wisely and responsibly. [QDR]

Four priority objectives help defend and advance our national interests: to prevail in today's wars, to prevent and deter conflict, to prepare to defeat adversaries and succeed in a wide range of contingencies, and to preserve and enhance the all-volunteer force. [QDR, *National Defense Strategy*]

China, the world's most populous country, and India, the world's largest democracy, will continue to shape an international system that is no longer easily defined, one in which the US must work with key allies and partners if it is to sustain stability and peace. [QDR, *National Defense Strategy*]

As technological innovation and global information flows accelerate, non-state actors will continue to gain influence and capabilities that, during the past century, remained largely the purview of states. Proliferation of weapons of mass destruction (WMD) will continue to undermine global security: the instability or collapse of a WMD-armed state is among our nation's most troubling concern and could lead to a global crisis. [QDR]

Environmental trends within the security environment: rising demand for resources, rapid urbanization of littoral regions, effects of climate change, emergence of new strains of disease, profound cultural and demographic tensions. [QDR]

The core capabilities, (Department of Navy, US Marine Corps and US Coast Guard) intrinsically linked and mutually supporting enablers for achieving the results outlined in *A Cooperative Strategy for 21st Century Seapower* (also called *The Maritime Strategy*) and the *Naval Operations Concept (NOC) 2010: Implementing the Maritime Strategy* are: regionally concentrated, credible combat power to limit regional conflict with deployed, decisive maritime power, to deter a major power war, and to win our nation's wars; and globally distributed mission-tailored maritime forces to contribute to homeland and defense in depth, foster and sustain cooperative relationships with more international partners, and prevent or contain local disruptions before they impact the global system. [NOC]

The maritime domain includes oceans, seas, bays, estuaries, islands, coastal areas, and the airspace above these, including the littorals, comprised of the seaward portion — the open ocean to the shore, and the landward portion — the area inland from the shore that can be supported and defended directly from the sea. Aspects of the maritime domain include *blue water* — the open ocean; *green water* — coastal waters, ports and harbors, and *brown water* — navigable rivers and their estuaries. The complexity of the maritime domain encompasses the confluence of water, air, land, as well as space and cyberspace: this is the environment — a precious resource shared by the global community — in which naval forces operate. [NOC]

Effective aggregation of maritime forces relies on common tactics, techniques and procedures associated with intelligence, C2, fires, maneuver, logistics and force protection, underscoring the importance of sufficient joint and combined training, and interoperable systems to achieve and sustain operational readiness: the Naval Service constantly seeks to sustain this critical foundation, to include its allies and partners. [NOC, *National Military Strategy, National Defense Strategy*]

90% of the world's good travel by sea. [NOC]

Naval forces provide a persistent presence, self-sustaining, sea-based expeditionary forces, maritime domain expertise, flexible force options, expanded deterrence, and joint, multinational and interagency enabling forces. [NOC, *National Military Strategy, National Defense Strategy*]

The Naval Services uses the sea as maneuver space, which requires the ability to collect and share information to enhance global awareness of activities in the maritime domain; to employ, support and sustain task-organized overextended ranges and durations to conduct diverse and often concurrent missions, engagements, relief and reconstruction, security and combat operations; the capacity to confront irregular challenges, especially in the littorals; to maintain due regard for national sovereignty, statutory responsibilities and legal authorities among the various US and international participants; and to support joint interagency and international partners through seabasing — the deployment, assembly, command, projection, reconstitution, and re-deployment of joint power from the sea, without reliance on land bases within the operational area. [NOC]

The Naval Service supports US government initiatives to help mitigate the causes of instability, improve governance, advance the rule of law and secure the flow of resources — frequently in concert with allies, partners, international organizations and non-governmental organizations. [NOC]

Maritime security, which may be divided into individual or collective categories, is a non-doctrinal term defined as those tasks and operations conducted to protect sovereignty and maritime resources, support free and open seaborne commerce, and to counter maritime terrorism, weapons proliferation, transnational crime, piracy, environmental destruction, and illegal seaborne immigration. [NOC, *National Security Strategy, National Defense Strategy*]

Global maritime security requires the integration of national and regional maritime cooperation, awareness, and response initiatives and unprecedented coordination among governments, the private sector, multinational organizations, naval and maritime security forces, law enforcement agencies, customs and immigration officials, masters of vessels and other merchant mariners, shipping companies and port operators. [NOC, *National Security Strategy, National Strategy for Maritime Security*]

Naval forces must appropriately apply the full range of nuclear, conventional and cooperative means available to deter actions by state and non-state adversaries that threaten US interests at home or abroad. [NOC, *National Military Strategy, National Defense Strategy, National Security Strategy*]

Many 21st century problems require solutions that involve the coordinated application of all elements of national power, often in tandem with multinational and non-governmental organizations; however, at present, interagency and multinational coordination lacks a formal process framework and supporting architecture: Naval forces must be capable of collaboratively planning, preparing, executing and assessing operations through innovative applications of the related naval processes. [*NOC, National Security Strategy, National Defense Strategy*]

Our Thoughts

- In executing our responsibilities, we must recognize that first, and foremost, the United States is a nation at war. [*QDR*]
- We must ensure the success of our forces in the field, especially in Afghanistan, Iraq and around the world, and to help the governments of Afghanistan and Pakistan disrupt, dismantle and defeat Al-Qaeda and eliminate its safe havens within both nations. [*QDR, National Security Strategy, National Military Strategy*]
- Sailors, Marines and Coast Guardsmen are, and will always be the foundation of the Naval Service. [*NOC, National Strategy for Maritime Security*]
- Naval forces will continue to be in high demand across the range of military operations largely because they effectively bridge the seams between water, land and air. [*NOC*]
- Sea control is the foundation of seapower, fundamental to exploiting the maritime domain as maneuver space, protecting critical sea lines of communication, and sustaining combat power overseas. [*NOC, National Security Strategy*]
- America's interests are inextricably linked to the integrity and resilience of the international system; our chief interests are security, prosperity, broad respect for universal values and an international order that promotes cooperative action. [*QDR, National Defense Strategy*]
- As a global power, the strength and influence of the United States are deeply intertwined with the fate of the broader international system of alliances, partnerships, and multinational institutions. [*QDR, National Security Strategy*]
- Preventing the rise of threats to US interests requires the integrated use of diplomacy, development, and defense, along with intelligence, law enforcement and the economic tools of statecraft, leveraging existing alliances and creating conditions to advance common interests. [*QDR, National Defense Strategy*]
- Naval forces provide the ideal means in such a security environment to accomplish a wide variety of missions conducted independently or in concert with joint, interagency, international and non-governmental partners that share US interests in promoting a safe and prosperous world. [*NOC, National Defense Strategy*]
- Global awareness is being improved through the cumulative results of professional development, technological enhancements, and cooperative information sharing. [*NOC, National Security Strategy*]
- The primary focus of the naval forces remains combat effectiveness; however, their multi-mission capabilities allow those same forces to provide rapid assistance that can mitigate human suffering and restore critical partner capacity in the wake of humanitarian crises. [*NOC*]

NAVAL POSTGRADUATE SCHOOL: DEPARTMENT OF DEFENSE

Observations

From the NPS Fact Book 2009

- **Master's degrees awarded:** 1,153
- **PhD's awarded:** 21
- **Engineer:** 5
- **Resident Students:** 1,489 (including 213 international students)
- **Distance/Distributed Learning Programs:** 967 (706 degree and 261 certificate); thousands enrolled in short courses at NPS, in other US locations and other nations
- **Graduation Rate (resident):** 905; Average time-to-degree: 20 months
- **Degrees Conferred by Service:**
 - USA/R: 96
 - USAF: 137
 - USMC: 90
 - USN/R: 462
 - USCG: 8
 - Civilian: 218
- **Faculty:** 708 tenure, tenure-track and non-tenure track faculty, including administrative faculty. 4% of tenure-track professors are distinguished; 6% (instructional) are military.
- **Staff:** 508 GS/wage grade (396 full-time and 112 part-time)
- **Contractors:** 167 full-time equivalents
- **Cooperative Research and Development Agreements:** 20
- **Sponsored program funding:** \$200 million
- **Operating budget:** \$494.9 million, including military salaries
- **Direct authorization:** \$96.2 million, without military salaries
- **Reimbursable authorization:** \$207 million
- **Classrooms with media technology:** 77
- **Classrooms with video-teleconferencing:** 13
- **Laboratories (includes research/teaching):** 140
- **Classified facilities:** 3
- **Accreditations:** Western Association of Schools and Colleges, Accreditation Board for Engineering and Technology, Association to Advance Collegiate Schools of Business, National Association of Schools of Public Affairs and Administration

Average on Board Student Population 2005-2009

SERVICE	2005	2006	2007	2008	2009
USN/R	709	707	713	685	660
USAF	216	273	263	201	166
USMC	192	200	180	163	178
USA/R	108	132	179	163	158
Other Srves.	6	8	11	10	10
Civilian	41	137	93	114	104
International	290	275	267	230	213

Total Residents	1,562	1,732	1,706	1,566	1,489
Distributed Learning	541	501	600	719	707
Totals	2,103	2,233	2,306	2,285	2,196

AOB Resident Enrollments by School and FY 2005-2009
(Office of Institutional Research July 2010)

School	2005 AVG	2006 AVG	2007 AVG	2008 AVG	2009 AVG
All Schools	1,736	1,762	1,767	1,607	1,594
GSBPP	325	343	331	255	246
GSEAS	437	436	420	394	386
GSOIS	575	615	612	555	584
SIGS	321	315	357	361	325
Provost*	55	51	42	34	22
Continuing Education	31	15	19	23	44

*Provost: Formerly known as SEAAC, Systems Engineering and Analysis Curriculum Committee

ACADEMICS/STUDENTS

Degree Program Students by Type of Enrollment: Full-time resident peaked in 2007 at 1,739 and declined to 1,566 in 2008 and 1,489 in 2009. Distributed Learning students peaked at 847 in 2007, declined to 719 in 2008 and 707 in 2009.

Degree Program Students by School: GSEAS 30%; GSOIS: 28%; GSBPP 25%; SIGS 16%; Other 1%.

Resident Degree Students by School and Service

School	USN	USMC	USA	USAF	Civilian	Int'l	Other	Total
GSBPP	125	41	20	13	4	35	1	239
GSEAS	239	20	15	22	14	62	3	374
GSOIS	220	83	101	18	23	91	3	538
SIGS	59	34	22	113	63	25	3	318
Other	18	--	--	--	--	1	--	20
Total	660	178	158	166	104	213	10	1,489
Total %	44%	12%	11%	11%	7%	14%	1%	100%

Resident Degree Students by Ethnicity: White – 63.5%; International – 14.8%; African-American – 5.9%; Hispanic/Latino – 6.1%; Asian American/Pacific Islander – 4.4%; American India/Alaskan Native - .7%; Unknown – 4.5%.

Resident Degree Students by Gender: Male – 89.7%; Female 10.3%.

Mobile Education Teams: 181 with 5,806 participants; visited 58 countries: 51,000 students instructed through Regional Security Education
10, 937 students instructed through Leadership Development and Education for Sustained Peace

On-Campus Short Courses: 43 in-resident courses with 1,012 participants

Degrees Conferred by Academic School 2005-2009

Schools	2005	2006	2007	2008	2009
GSBPP	230	325	331	330	255
GSEAS	214	293	355	254	328
GSOIS	299	296	329	328	335
SIGS	187	180	195	227	243
Other	--	34	30	25	18
Total	930	1,128	1,240	1,164	1,179

Degrees Conferred (2009)

- Electrical Engineering: 4
- EMBA Master of Business Administration: 93
- Computer Technology: 6
- Systems Analysis: 37
- Systems Engineering: 1
- Security Studies (Combating Terrorism: Policy & Strategy): 1
- Security Studies (Middle East, S. Asia, Sub-Saharan Africa): 46
- Security Studies (Civil-Military Relations): 3
- Security Studies (Defense Decision-Making and Planning): 38
- Security Studies (Europe and Eurasia): 22
- Security Studies (Far East, SE Asia, the Pacific): 38
- Security Studies (Homeland Security and Defense): 71
- Security Studies (Stabilization and Reconstruction): 6
- Security Studies (Western Hemisphere): 18
- Master of Business Administration: 112
- Mechanical Engineering: 1
- Applied Mathematics: 12
- Applied Physics: 31
- Astronautical Engineering: 8
- Combat Systems Technology: 6
- Computer Science: 35
- Contract Management: 8
- Defense Analysis (Irregular Warfare)
- Defense Analysis (National Security Affairs): 11
- Defense Analysis (Terrorist Operations Irregular Warfare): 25
- Electrical Engineering: 42
- Electrical Warfare Systems Engineering: 8

- Engineering Acoustics: 7
- Engineering Science (Electrical Engineering): 1
- Engineering Science (Mechanical Engineering): 4
- Engineering Systems: 14
- Human Systems Integration: 9
- Information Operations: 13
- Information Systems and Operations: 5
- Information Technology Management: 36
- Information Warfare Systems Engineering: 9
- Management: 29
- Mechanical Engineering: 31
- Meteorology: 15
- Meteorology and Physical Oceanography: 12
- Modeling, Virtual Environments and Simulation: 16
- Operations Research: 68
- Physical Oceanography: 7
- Physics: 7
- Program Management: 13
- Software Engineering: 2
- Space Systems Operations: 13
- Systems Technology (Command, Control and Communications): 10
- Systems Engineering: 80
- Systems Engineering Analysis: 18
- Systems Engineering Management: 20
- PhD Astronautical Engineering: 1
- PhD Computer Science: 3
- PhD Electrical Engineering: 6
- PhD Mechanical Engineering: 3
- PhD Meteorology: 1
- PhD Modeling, Simulation and Virtual Environments: 2
- PhD Operations Research: 2
- PhD Physics: 1
- PhD Software Engineering: 2
- **Grand Total: 1,179**

ENVIRONMENTAL SCAN: BIBLIOGRAPHY

I. DEPARTMENT OF DEFENSE PLANS AND STRATEGIES

Cooperative Strategy for 21st Century Seapower 2007

<https://www.hsdl.org/?view&doc=83814&coll=public>

Joint maritime strategy: United States, Navy, Marine Corps, and Coast Guard.

Department of Defense Information Management and Information Technology Strategic Plan 2008-2009

http://cio-nii.defense.gov/docs/DoDCIO_Strat_Plan.pdf

Vision, mission, goals and strategies for information management and technology within the Department of Defense.

Department of Defense Open Government Plan 2010

<http://open.dodlive.mil/files/2010/04/DoD-Open-Gov-Plan-v1.0-2010-04-07.pdf>

Deputy Chief Management Office's approach to public engagement and establishing and maintaining an open government.

Department of Defense Strategic Management Plan 2009

<http://dcmo.defense.gov/documents/2009SMP.pdf>

Business priorities, goals, measures and key initiatives; performance management system.

Homeland Security – Strategic Plan 2008

<http://www.dhs.gov/xabout/strategicplan/>

Mission, services, initiatives, priorities, performance assessments, methods of monitoring success in implementing strategic programs and progress in linking programs and operations to performance measures, mission goals, resource priorities, and strategic objectives.

Joint Electronic Library (JEL) web site: <http://www.dtic.mil/doctrine/>

- Current Joint publications: http://www.dtic.mil/doctrine/new_pubs/jointpub.htm
- Various doctrine publications: <http://www.dtic.mil/doctrine/doctrine/doctrine.htm>

Joint Operating Environment 2010

http://www.jfcom.mil/newslink/storyarchive/2010/JOE_2010_o.pdf

Study which outlines the constants: war, change and disruptions; trends influencing world security; the contextual world; implications for joint forces; and future opportunities.

National Defense Strategy of the United States of America 2008

<https://www.hsdl.org/?view&doc=101242&coll=public>

Strategic framework and objectives; how to defend the homeland, promote security, deter conflicts, strengthen partnerships, establish “jointness” and manage risks.

National Military Strategy of the United States of America February 2010

merln.ndu.edu/index.cfm?secID=116&pageID=3&type

Strategic framework and objectives for the military.

National Security Strategy of the United States of America 2009

merln.ndu.edu/index.cfm?secID=116&pageID=3&type.

Strategic framework and objectives for US security.

Naval Operations Concept: Implementing the Maritime Strategy 2010

<http://www.navy.mil/maritime/noc/NOC2010.pdf>

Outline of how to implement the Maritime Strategy.

Nuclear Posture Review web site: <http://www.defense.gov/npr/>

- ***Nuclear Posture Report 2010***

<http://www.defense.gov/npr/docs/2010%20Nuclear%20Posture%20Review%20Report.pdf>

Study on the nuclear security environment; reducing the role of nuclear weapons; strategic deterrence and stability during reduced nuclear force levels; deterrence; reassuring partners and allies.

Space Posture Review web site: <http://www.defense.gov/spr/>

Covering 2009-2019; legislatively mandated review of U.S. national security space policy and objectives; analyzes relationship between military and national security space strategy and assesses space acquisition programs, future space systems and technology development.

Strategic Defense Reviews web site: <http://www.defense.gov/defensereviews/>

Quadrennial Defense Review web site: <http://www.defense.gov/QDR/>

- ***Quadrennial Defense Review Report 2010***

http://www.defense.gov/QDR/images/QDR_as_of_12Feb10_1000.pdf

Defense strategies, objectives and environment; the role of military power; rebalancing the force; caring for military personnel; strengthening relationships with allies and partners.

- ***The QDR in Perspective: Meeting America's National Security Needs in the 21st Century (Corrected Advance Copy)***

<http://www.usip.org/files/qdr/qdrreport.pdf>

The final report of the Quadrennial Defense Review Independent Panel.

Report of the Defense Science Board 2010 Study on Enhancing Adaptability of US Military Forces Part A. Main Report January 2011.

Office of the Under Secretary of Defense for Acquisition, Technology and Logistics:
Washington, DC.

Unmanned Systems Roadmap 2007-2032

<https://www.hsdl.org/?view&doc=86466&coll=documents>

Purpose, scope, vision, mission, goals, objectives, background, acquisition, funding, departmental responsibilities, mission and capabilities of unmanned systems.

US Inspector of Homeland Security Strategic Plan 2008-2013

http://www.dhs.gov/xoig/assets/OIG_StrategicPlan_FY08_13.pdf

Mission, values, principles, performance goals, objectives, strategic measures, programs, operations, collaborations; annual performance plan and organization chart.

II. SERVICE PLANS

AIR FORCE

Air Force Contracting Strategic Plan 2009-2013

<http://ww3.safaq.hq.af.mil/shared/media/document/AFD-070517-042.pdf>

Mission, vision, goals, objectives, workforce, products, customers, stakeholders, components, governance, principles, approach and action plan.

ARMY

Army Cyberspace Operations Concept Capability Plan 2016-2028 [TRADOC Pamphlet 525-7-8] <http://www.tradoc.army.mil/tpubs/pams/tp525-7-8.pdf>

Pamphlet outlining the 2010 framework for the problems, environment and solutions related to cyberspace.

Army documents web site: <http://www.army.mil/info/references/>

Site which contains strategic planning guidance, fact files, posture statements, Army Modernization Plan 2009, weapons systems plans, and Army handbooks.

Army Posture Statements web site: <http://www.army.mil/info/institution/posturestatement/>

- *Army Posture Statement 2010*

https://secureweb2.hqda.pentagon.mil/VDAS_ArmyPostureStatement/2010/index.asp

Conflicts in the 21st century; trends; role of land forces; critical challenges; restoring balance; the Army's four imperatives: sustain, prepare, reset, transform; future conditions; the 21st century Army; stewardship and innovation.

MARINE CORPS

Concepts & Programs 2010

<http://www.usmc.mil/unit/pandr/Documents/Concepts/2010/CP2010Index.html>

<http://www.usmc.mil/unit/pandr/Pages/candp.aspx>

A publication produced annually by the Programs & Resources Department; articulates the modernization requirements of the United States Marine Corps, and presents an overview of current plans; offers a "once across the Corps" perspective that includes a description of the conceptual view of warfighting, an overview of the operations of the past year, and an examination of the specific programs that will provide Marines with technologically superior weapons platforms, systems, and equipment.

NAVY

Navy Posture Statement 2010

http://www.navy.mil/navydata/people/secnav/mabus/posture_statement_2010.pdf

Written congressional testimony of the honorable Ray Mabus, Secretary of the Navy: February 24, 2010.

Program Guide to the U.S. Navy 2010

<http://www.navy.mil/navydata/policy/seapower/sne10/sne10-all.pdf>

Strategic vision, naval aviation, surface combatants, global presence, ships and crafts, weapons, sensors, equipment, combat and submarine systems, and action

III. REPORTS/STRATEGIES/PLANS IMPORTANT TO THE DEPARTMENT OF DEFENSE

Business Transformation Agency (DOD) 2010 Congressional Report on Defense Business Operations

<http://www.bta.mil/products/CongressionalReport/MCR2010.pdf>

Improvements to DoD enterprise and components of business operations; milestones.

Cybersecurity 2010 web site:

<http://www.whitehouse.gov/cybersecurity/comprehensive-national-cybersecurity-initiative>

Site for the Comprehensive National Cybersecurity Initiative.

Department of Defense Cyber Security web site:

http://www.defense.gov/home/features/2010/0410_cybersec/

DoD Cyber Command home page.

National Drug Control Strategy 2010

<http://www.whitehousedrugpolicy.gov/publications/policy/ndcs10/ndcs2010.pdf>

Approaches to combating America's drug problem; challenges; efforts, including early intervention, integrated treatments, family commitment, intervention, breaking the cycle; public policy; international interdiction and partnerships.

National Health Security Strategy 2010 <https://www.hsdl.org/?view&doc=116534&coll=public>

Vision, goals, objectives, framework, strategies, implementation and evaluation methods for national health security.

National Intelligence Strategy 2009

<https://www.hsdl.org/?view&doc=113175&coll=documents>

Vision, goals, objectives, strategies, implementation and evaluation methods for national intelligence. Three imperatives: agencies must be integrated, agile and exemplify American values.

National Intelligence Council: China: The Impact of Climate Change to 2030 (NIC-2009-02D) http://www.dni.gov/nic/PDF_GIF_otherprod/climate_change/climate2030_china.pdf

Assessment identifying the latest peer-reviewed research related to the impact of climate change on China including sea level rise, water availability, agricultural shifts, ecological disruptions and species extinctions, infrastructure at risk from extreme weather events (severity and frequency), and disease patterns.

***NATO 2020: Assured Security; Dynamic Engagement
Analysis and Recommendations of the Group of Experts on a New Strategic Concept for
NATO***

http://www.nato.int/cps/en/natolive/official_texts_63654.htm

A 2009/2010 report from a broadly-based group of qualified experts, led chair Madeleine K. Albright (United States) and vice-chair Jeroen van der Veer (The Netherlands), preparing the groundwork for a new NATO strategic concept. An interim statement was presented to NATO's governing body (the North Atlantic Council) on November 24, 2009; this is the final report. The document includes a summary of findings and a more detailed discussion of leading issues, and analysis and recommendations intended to assist the Secretary General in drafting a new strategic concept for submission to NATO heads of government at the November 2010 summit in Lisbon.

Quadrennial Homeland Security Review Report 2010

<https://www.hsdl.org/?view&doc=117525&coll=public>

Strategic framework for a secure homeland; overview of homeland security: defining and framing; terrorism and enhanced security; enforcing and administering immigration laws; safeguarding and securing cyberspace; ensuring resilience in disasters; roles, responsibilities, objectives, goals; the review process; the path ahead.

US Department of Education - ED.gov - US Higher Ed Final Report 2010

<http://www2.ed.gov/rschstat/eval/highered/student-support/final-report.pdf>

National evaluation of student support services; examination of student outcomes after six years.

White House 2010 National Security Strategy

http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf

White House: strategic approach to security, prosperity, values and international order.

The White House Blog entry on the *White House 2010 National Security Strategy* is at:

<http://www.whitehouse.gov/blog/2010/05/27/a-blueprint-pursuing-world-we-seek>

IV. OTHER RELEVANT REPORTS

Center for Strategic and Budgetary Assessments (CSBA) web site:

<http://www.csbaonline.org/2006-1/index.shtml>

- ***AirSea Battle: A Point-of-Departure Operational Concept 2010***
http://www.csbaonline.org/4Publications/PubLibrary/R.20100518.Air_Sea_Battle_A_/R.20100518.Air_Sea_Battle_A_.pdf
Concepts, problems, and substance of AirSea, “piece-parts” and point-of-departure AirSea battle concepts.

Chemical and Biological Defense Program (CBDP) web site: <http://www.acq.osd.mil/cp/>

- **Various reports** <http://www.acq.osd.mil/cp/cbd.html>
Site containing:

- *DoD Chemical and Biological Defense Program Annual Report to Congress 1994-2009*
- *CBDP Research, Development and Acquisition Plan 2009*
- *Joint Service CBDP Program Overview 2000-2009*
- *Chemical Biological Defense Strategic Plan 2008*
- *CBRN Defense Modernization Plan 2008*

Congress. House Armed Services Committee web site: <http://armedservices.house.gov>

- *Another Crossroads? Professional Military Education Two Decades after the Goldwater-Nichols Act and the Skelton Panel 2010*
<http://armedservices.house.gov/pdfs/PMEReport050610/PMEReport050610.pdf>
House Armed Services Committee members and staff; background, system issues, institutional issues, issues for further study.

Defense Science Board (DSB) web site: <http://www.acq.osd.mil/dsb/>

- Various reports: <http://www.acq.osd.mil/dsb/reports2000s.htm>
Site containing reports from 1970-current: specific to 2009-2010:
 - *Capability Surprise, Volume II; supporting papers 2010*
 - *Capability Surprise 2009*
 - *Fulfillment of Urgent Operational Needs 2009*
 - *DoD Biological Safety and Security Program 2009*
 - *Creating a DoD Strategic Acquisition Platform 2009*
 - *Understanding Human Dynamics 2009*
 - *Advanced Computing 2009*
 - *DoD Policies and Procedures for the Acquisition of Information Technology 2009*
 - *Time Critical Strike from Strategic Standoff 2009*
 - *Challenges to Military Operations in Support of U.S. National Interests -- Vol 2 Main Report (2007 Summer Study) 2008*
 - *Nuclear Weapons Inspections for the Strategic Nuclear Force 2008*
 - *Challenges to Military Operations in Support of U.S. National Interests -- Vol 1 Executive Summary (2007 Summer Study) 2008*
 - *Integrating Sensor-Collected Intelligence 2008*
 - *Nuclear Deterrence Skills 2008*
 - *Defense Imperatives for a New Administration 2008*
 - *Creating an Effective National Security Industrial Base for the 21st Century: An Action Plan to Address the Coming Crisis 2008*
 - *Developmental Test and Evaluation 2008*
 - *Report on the Unauthorized Movement of Nuclear Weapons 2008*
 - *DoD Energy Strategy, More Fight - Less Fuel 2008*
 - *Strategic Communication (2007 Summer Study) 2008*

Federal Chief Information Officers Council web site: <http://www.cio.gov>

- *Net Generation Guide 2010* <http://www.cio.gov/Documents/NetGen.pdf>
Defining the federal IT workforce; current environment; forecast of future labor supply and demand; strategic planning; norms and characteristics of the Net Generation;

opportunities and challenges of a multi-generational workforce; management and employee engagement; professional development and career management; shaping the workforce through Web 2.0 technologies; compensation, benefits, flexibility; life and work balance.

National Counterterrorism Center web site: <http://www.nctc.gov/>

- ***Report on Terrorism 2009***

<http://wits-classic.nctc.gov/ReportPDF.do?f=crt2008nctcannexfinal.pdf>

Table of Contents: Methodology Utilized to Compile NCTC's Database of Attacks; NCTC Observations Related to Terrorist Incidents Statistical Material; Trends in Person-borne Improvised Explosive Device (PBIED) vs. Suicide Vehicle-borne Improvised Explosive Device (SVBIED) Attacks; Trends in Sunni High-Fatality Attacks; Statistical Charts and Graphs; Chronology of High-Fatality Terror Attacks.

U.S. China Economic and Security Review Commission web site: <http://www.uscc.gov/>

- ***Capability of the People's Republic of China to Conduct Cyber Warfare and Computer Network 2009***

http://www.uscc.gov/researchpapers/2009/NorthropGrumman_PRC_Cyber_Paper_FINAL_Approved%20Report_16Oct2009.pdf

Key entities in Chinese Computer Network Operation (CCNO), strategies, including those during conflicts; cyber-espionage; operational profile of an advanced cyber intrusion; timeline of significant Chinese related cyber events 1999-present; chronology of alleged Chinese computer network exploitation events; targeting US and foreign networks.

V. HIGHER EDUCATION

Accreditation-Related Information

Accreditation Board for Engineering and Technology (ABET) web site:

<http://www.abet.org/>

- ***Accreditation Policy and Procedure Manual. Effective for Evaluations During the 2010-2011 Accreditation Cycle*** <http://www.abet.org/Linked%20Documents-UPDATE/Criteria%20and%20PP/A004%2010-11%20Accredition%20Policy%20and%20Procedure%20Manual%2011-05-09.pdf>

- **Accreditation Statistics 2007-2008 Cycle and Trend Data**

<http://www.abet.org/Linked%20Documents-UPDATE/Stats/08-AR%20Stats.pdf>

The Council for Higher Education Accreditation (CHEA) web site: <http://www.chea.org/>

The Association to Advance Collegiate Schools of Business (AACSB) web site:

<http://www.aacsb.edu/>

Western Association of Schools and Colleges (WASC) web site: <http://www.wascenior.org/>

- *NPS Capacity and Preparatory Review Report 2008; Educational Effectiveness Review Report 2010; Institutional Proposal 2006; Letter Accepting Proposal from WASC 2008*
<http://intranet.nps.edu/WASC/>.

Accountability and Assessment

The National Center for Public Policy and Higher Education: Partnership for Public Purposes: Engaging Higher Education in Societal Challenges of the 21st Century 2008.

<http://www.highereducation.org/reports/wegner/wegner.pdf>

Essay based on a special roundtable on policy, leadership, and governance convened in May 2007; focus is on making public policy a key for engaging higher education institutions in addressing public purposes.

Immerhwar, J, J Johnson & P Gasbarra. October 2008. ***The Iron Triangle: College Presidents Talk About Costs, Access, and Quality.*** National Center Report #08-2 [The National Center for Public Policy and Higher Education and Public Agenda]

http://www.highereducation.org/reports/iron_triangle/iron_triangle.pdf

Commission(s) on the Future

American Association of University Professors web site:

<http://www.aaup.org/AAUP/GR/federal/FutureofHigherEd/>

Association of American Universities web site:

http://www.aau.edu/policy/commission_future.aspx?id=6876

Council of Graduate Schools web site: <http://www.cgsnet.org/Default.aspx?tabid=387>.

Council of Graduate Schools – Reference links:

http://www.fgereport.org/rsc/pdf/CFGE_report.pdf

http://www.fgereport.org/rsc/pdf/ExecSum_PathForward.pdf

Georgia Tech Research Institute External Advisory Council: Social Media clip

http://www.youtube.com/watch?v=sIFYPQjYhv8&feature=player_embedded

Naval Postgraduate School: Committee on the Future web site:

http://cmsprod:9992/Rhythmyx/assembler/render?sys_revision=2&sys_siteid=305&sys_authtype=0&sys_contentid=31189&sys_variantid=1031&sys_folderid=31164&sys_context=0

Naval Postgraduate School: Committee on the Future SharePoint site:

<http://infores/futurecom/default.aspx>.

University of California (UC) Commission on the Future of the University web site:

<http://ucfuture.universityofcalifornia.edu/news.html>.

University of California – Reference links for UC Commission on the Future:

<http://ucfuture.universityofcalifornia.edu/news.html>

<http://www.ucop.edu/newsroom/newswire/img/17/17109139134b9007910ed40.pdf>

<http://www.universityofcalifornia.edu/news/article/21869/>

University of California Davis – Reference link for UC Commission on the Future:

http://gsa.ucdavis.edu/UC_Commission_on_the_Future

University of California San Francisco – Reference links for UC Commission on the Future:

<http://senate.ucsf.edu/0-currentissues/uccommissiononthefuture.html>

http://www.dailycal.org/article/108780/uc_commission_on_the_future_releases_initial_findi

University of Virginia – Reference link for UC Commission on the Future:

<http://www.virginia.edu/planningdocuments/commission/>

Information Technology

DOD 2010 Policy for Responsible and Effective Use of Internet-Based Capabilities

<http://www.defense.gov/NEWS/DTM%2009-026.pdf> .

A policy memorandum regarding the safe and effective use of Internet-based capabilities, including social networking services (SNS) and other interactive Web 2.0 applications.

The Future of Higher Education: How Technology Will Shape Learning. Economist Intelligence Unit report sponsored by the New Media. 2008 Consortium.

[http://www.nmc.org/pdf/Future-of-Higher-Ed-\(NMC\).pdf](http://www.nmc.org/pdf/Future-of-Higher-Ed-(NMC).pdf)

How technology is changing today's classrooms; role of online learning; global competition and the workforce; corporate-university partnerships; challenges in rewriting education.

Technology Review Magazine June 2010

Emerging Technologies. <http://www.technologyreview.com/tr10/>

10 Real time search, Solar Fuel, Mobile 3D, Engineered Stem Cells, Light Trapping Photovoltaics, Social TV, Green Concrete, Implantable Electronics, Cloud Programming, Dual-Action Antibodies.

International Context

Africom/United States Africa Command web site: <http://www.africom.mil/>

Asia's Rising Science and Technology Strength: Comparative Indicators for Asia, the European Union, and the United States. NSF 07-319 August 2007. National Science Foundation. <http://www.nsf.gov/statistics/nsf07319/>

Reports on education, science and engineering workforce, research and development expenditures, science and engineering publications, patents, and high technology industries.

Regets, MC. **Research Issues in the International Migration of Highly Skilled Workers: A Perspective with Data from the United States.** SRS 07-203. June 2007. National Science Foundation. <http://www.nsf.gov/statistics/srs07203/pdf/srs07203.pdf>

An overview of research issues related to the effects of the growing migration of highly skilled workers on the world economy and economic policy, with special reference to the international mobility of scientists and engineers. It points out U.S. data sets (collected by the National Science Foundation's Division of Science Resources Statistics, other Government agencies, and private organizations) that, along with databases from the Organization for Economic Cooperation and Development and the European Union, may be used to provide at least partial answers to questions prompted by these issues. The paper lays out a theoretically informed road map for the better understanding of these dynamic and far-reaching developments.

National Academies, Associations, Centers and Foundations

National Academy of Sciences web site: www.nationalacademies.org

This honor society consists of distinguished science and engineering scholars that perform research in order to further their field of study. The Academy promotes research to improve health, education and general welfare of the country's population.

- **America's Energy Future: Technology and Transformation 2009**
http://www.nap.edu/catalog.php?record_id=12091
Book: context, challenges, key findings, results from technology assessments, energy efficiency, renewable, nuclear, and fossil-fuel energy, alternate transportation fuels, electricity transmission and distribution.
- **Approaches to Future Space Cooperation and Competition in a Globalizing World: Summary of a Workshop 2009.** http://www.nap.edu/catalog.php?record_id=12694
Book: summarizes a public workshop held in November 2009 for space and earth science research and exploration, including lessons learned, international cooperation, competition, and potential partnerships.
- **Engineering Workforce Commission (EWC) Engineering Enrollment Trends**
http://www.ewc-online.org/data/enrollments_data.asp
- **InterAcademy Council: Women for Science**
<http://www.interacademycouncil.net/?id=11228>
Report focusing on three themes: academies promoting the education and careers of women, engaging women in global capacity building and building inclusive climates and advising governments and other principal players on specific actions toward similar ends. Topics: overview, agenda, measures on access, partnership and progression, technological empowerment for women of grassroots, academies action and leadership plans.
- **Joint Statement to the United Nations on UN Millennium Development Goals**
<http://www.interacademycouncil.net/CMS/Reports/9588.aspx>

Joint statement — sponsored by the InterAcademy — from leaders of scientific, engineering and medical organizations to US leaders at the UN General Assembly in September 2005, asking members to strengthen worldwide capacities in science, technology and innovation.

- **Rising Above the Gathering Storm Two Years Later: Accelerating Progress Toward a Brighter Economic Future 2009** http://www.nap.edu/catalog.php?record_id=12537
Book: From a convocation in 2008 in which US leaders were asked to strengthen math and science in K-12 and higher education, and to sustain an environment in which the US maintains its edge in science and engineering and innovation.

National Center for Higher Education Management Systems (NCHEMS) web site:
<http://www.nchems.org/>

National Education Association (NEA) web site: <http://www2.nea.org/he/>

- **The National Education Association (NEA) 2010 Almanac of Higher Education web site:** <http://www.nea.org/home/1819.htm>
For NEA members: provides current information on the entire scope of American higher education, contains up-to-date information on faculty salaries and benefits, the economic conditions in the states, faculty workload, trends in bargaining, and information on non-faculty professionals on campus.

National Science Foundation web site: www.nsf.org

The National Science Foundation offers funding and research for science and engineering through grants and funding from grants, cooperative agreements, and government agencies. A diverse group of students benefit from the Foundation, ranging from K-12 to colleges and universities throughout the country. This organization supports academic activities at each academic level, including post doctorate and graduate work.

- **Graduate Students and Postdoctorates in Science and Engineering 1994- 2008 web site:** <http://www.nsf.gov/statistics/gradpostdoc/>
- **Federal Funds for Research and Development: Fiscal Years 2007-2009.** NSF 10-305. National Science Foundation. May 2010.
<http://www.nsf.gov/statistics/nsf10305/pdf/nsf10305.pdf>
Detailed statistical tables.
- Hoffer, TB, K Grigorian and E Hedberg. *Postdoc Participation of Science, Engineering, and Health Doctorate Recipients.* NSF 08-307 March 2008.
<http://www.nsf.gov/statistics/infbrief/nsf08307/nsf08307.pdf>
Information on postdoctoral statistics and trends in science, engineering and health.
- **Science and Engineering Indicators 2010, Chapter 2: Higher Education in Science and Engineering** <http://www.nsf.gov/statistics/seind10/>
Mathematics, science and engineering in higher education; national trends, international linkages, academic research and development, the global marketplace, public attitudes and understanding, and state indicators.

National Association of Schools of Public Affairs and Administration (NASPAA) web site:
<http://www.naspaa.org/>

- Raffel, Jeffrey A. (2009) “**What We Have Learned from the NASPAA Standards Review Process.**” *Journal of Public Affairs Education*, 16, no. 1: 5-12
<http://www.naspaa.org/jpaemessenger/Article/jpae-v16n1/raffel.pdf>
Text of the presidential address delivered on October 16, 2009, at the Annual Conference of the National Association of Schools of Public Affairs and Administration.

Naval Postgraduate School

Classroom Connections: Teaching at the Naval Postgraduate School

<http://www.nps.edu/video/portal/Channel.aspx?enc=BK38fkOJffF4Z9oD6KjocdnHVLbrQfVG>

Community Impact Study: The Ripple Effect, NPS and its Community 2005

<http://www.nps.edu/About/Publications/NPSpublications.html>

Information Technology: *Annual Accountability Reports*

<http://www.nps.edu/Technology/Services/ITACS-Publications.html>

Information Technology Strategic Plans: *The Information Revolution: Planning for Institutional Change (2003-2008) and Advancing the Mission 2009 – 2014*

<http://www.nps.edu/Technology/Services/ITACS-Publications.html>

Information Technology: *Technology News*

<http://www.nps.edu/Technology/Services/ITACS-Publications.html>

Institutional Advancement: *Annual Accountability Reports*

<http://infores/ir/default.aspx>

Institutional Advancement Strategic Plan

<http://infores/ir/default.aspx>

Institutional Research: *Annual Accountability Reports*

<http://infores/ir/default.aspx>

Institutional Research Strategic Plan

<http://infores/ir/default.aspx>

“**It’s About Value.**” by Hank Mauz. *US Naval Proceedings*. Volume 01.12618/1,170. August 2000.

LMI: *Organizational Structure Analysis Report of NPS*

Produced by LMI Government Consulting April 2008.

<http://infores/default.aspx>

Monterey Bay Higher Education and Research brochure

http://EDRES.MCNUSINESS.ORG/FILE_DEPOT/0-10000000/10000-20000/16786/FOLDER/69464/MONTEREY_BAY_EDUC_RESEARCH_BROCHURE.PDF

“Office of Institutional Research: AOB Resident Enrollments by School and FY 2000-2010.” July 2010. Monterey, CA: Naval Postgraduate School.

NPS Annual Report: “A Year of Tradition, Celebration and Discovery.”

<http://www.nps.edu/About/Publications/NPSpublications.html>

NPS Command Brief 2010 <http://www.nps.edu/About/Publications/NPSpublications.html>

NPS Fact Book 2005 and Fact Sheet 2008 <http://intranet.nps.edu/Admin/Publications.htm>

NPS Fact Book 2009 <http://www.nps.edu/About/Publications/NPS-CL-3109-WEB.PDF>

NPS In Review Magazine <http://www.nps.edu/About/Publications/NPSpublications.html>

NPS Strategic Plan: *Vision for a New Century 2008*

<http://intranet.nps.edu/Admin/Publications.htm>

Peer Analysis Study for the Naval Postgraduate School

By Denise P. Sokol and Paula Dickenson, CES Consultants, December 2008.

<http://infores/default.aspx>

Pentagon Channel Programs: “Inside NPS” March – August 2010

<http://www.pentagonchannel.mil>

Promoting Excellence in Teaching to Advance Learning (PETAL)NPS video

<http://www.nps.edu/video/portal/Video.aspx?enc=cOrAL6ntWmDlx4KAWxE3plz1uhtJAchs>

The State of the University Address May 27, 2010

<http://www.nps.edu/video/portal/Video.aspx?enc=z%2f53L6QoM1niy85fsbPGgPHIY8MBIUYR>

Update NPS monthly newsletter <http://www.nps.edu/About/Publications/NPSpublications.html>

Western Association of Schools and Colleges (WASC): *Capacity and Preparatory Review Report April 2010; Educational Effectiveness Review Report (August 2010)*

<http://www.nps.edu/About/Publications/NPSpublications.html>

Western Association of Schools and Colleges (WASC): *NPS Proposal, April 2010*

http://www.nps.edu/Images/Docs/WASC_CPR_final_gray.pdf

Ocean Policy

The Interagency Ocean Policy Task Force web site:

<http://www.whitehouse.gov/administration/eop/ceq/initiatives/oceans>

Science at Sea: Meeting Future Oceanographic Goals with a Robust Academic Research Fleet 2009 http://www.nap.edu/catalog.php?record_id=12775

Outlines demands and requirements of the US research fleet, a national resource, including remote technologies, adaptable research vessels, regional and global class ships, cooperation among the scientific community and agencies in all phases of ship design and acquisition and operations.

VI. BOOKS/REFERENCES: THE HIGHER EDUCATION ENVIRONMENT

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Topics: the Changing Competitive Environment; Enabling Innovation; More Than Just a Numbers Game.

“Change” magazine. May/June 2010.

<http://www.changemag.org/Archives/Back%20Issues/May-June%202010/quality-european-full.html>

Quality in European Higher Education – The influence of the Bologna Process.

“Commission on the Future: First Round of Recommendations from the Working Groups.” March 2010. Berkeley, CA: University of California.

“Commission on the Future of Graduate Education in the United States: The Path Forward: The Future of Education in the United States 2010.” Council of Graduate Schools and Educational Testing Service.

“Graduate Education: The Backbone of American Competitiveness and Innovation.” 2007. Council of Graduate Schools.

https://www.cgsnet.org/portals/0/pdf/GR_GradEdAmComp_0407.pdf

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Grummon, PhD., Phyllis, T.H. “Trends in Higher Education.” Vol. 6. N2.

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Katz, RN (Ed.) (2008) “The Tower and the Cloud: Higher Education in the Age of Cloud Computing.” Educause, [various relevant chapters]

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“Partnerships for Public Purposes: Engaging higher Education in Societal Challenges of the 21st Century.” April 2008. National Center for Public Policy and Higher Education.

Sherlock, Barbara J. Integrating Planning, Assessment, and Improvement in Higher Education. Washington, DC: NACUBO, 2009.

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“U.S. Department of Education: National Center for Education Statistics (annual): “The Condition of Education.” (NCES 2004-077). <http://nces.ed.gov/programs/coe/> Annual study performed by the National Center for Education Statistics to gather data that will aid in improving education in America.