EDI
April 17, 2012
Current U.S. STEM degree trends support increased investment in STEM to create the 1,000,000 more STEM graduates needed over next 10yrs, according to 2012 PCAST Report.
Nearly 65% of DoN science and engineering professionals are over age 40, and over 50% will be retirement eligible by 2020.

NOTES:
1) Navy workforce data as of 1 June 2009 provided by the Director, Acquisition Career Management, ASN(RDA)
2) National workforce data from Bureau of Labor Statistics 2008 annual average demographic employment data for selected occupational groups comparable to the Navy technical workforce
3) Total number of Navy employees is 21,311 and includes members of the Senior Executive Service, but not student trainees; total number of employees in national workforce data is 5.82 million
4) Navy data includes employees of the Naval Research Laboratory and all warfare centers
Strategic Themes

• **Diversity**
  Engage more under-represented populations

• **Best Practices**
  Partner with nationally recognized, best practice organizations, universities, and industry

• **Collaboration**
  Support the valuable implementation role of SYSCOMS and local organizations; leverage resources for maximum impact

• **Naval Relevance**
  Ensure programs are relevant to the Naval services; especially efforts supported with non-Navy funds

• **Metrics**
  Ensure that appropriate and consistent metrics, which assess both progress and impact, are in place across the Naval STEM Portfolio

• **Go Viral**
  Invest in programs and social networking tools that have the potential for rapid growth and geographic expansion
FY 11 Investment Profile

Fast Facts

- $80.8 M investment in STEM, plus $108 M for ONR supported domestic and graduate students
- 215 Programs (400+ engagements)
- 31 Commands
- 75,000 Students (+200,000 via festivals/fairs)
- All 50 States
Naval STEM Growth

**Double Direct Navy Investment per SECNAV & CNO Guidance**

- **Total Dollars ($M)**
- **Direct Navy ($M)**
- **Students (K)**

<table>
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<th>Year</th>
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<th>Students</th>
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<td>10/1/13-9/30/14</td>
<td>$116</td>
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 Currently in year 3 of SECNAV 5 Year Double Investment Plan

Actual: 10/1/08-9/30/09

Strong Estimate: 10/1/10-9/30/11

To Meet Goal: 10/1/12-9/30/13

SECNAV Tasking to ONR (NOV 2009)

SECNAV Speech to Double (MAY 2010)

Double Direct Navy Investment per SECNAV & CNO Guidance
All Navy STEM programs are stored in database in central location

- Active since 2009
- Capture all data in one place
- Stakeholders input program details
- Yearly data calls for program demographics
- Creates Navy-relevant STEM community on-line to share best practices and problem solving
K-12 Signature Programs
Science Engineering Apprenticeship Program
• High School Junior and Seniors
• Hands-on, experiential research internships at Labs and Warfare Centers alongside scientists and engineers.
• Research Abstract required at conclusion of internship

Fast Facts:
• 215 Students
  • 38% Female / 62% Male
  • 21% Minority Participation
• $701,100 Annually
• 19 Locations
• At end of internship, 60% of interns interested in Government S&E Career
• 60% alums pursuing STEM Education/Degree
• Program increased student interest in pursuing a career in STEM

Overall Assessment
• Highly Selective – only 7% applicants selected to participate
  • Overall high satisfaction ratings from students and mentors
  • Intern work product adds significant value to Navy S&T

Ongoing Metrics and Assessment
• Track % students
• Return as interns or participate in other Naval STEM programs
• Pursuing STEM Education/Degree
• Employed by Navy Labs
• No formal program review to date – slated for FY 2013
Iridescent Family Science Program
• A hands-on, experiential learning after school program
• Customized 10 Navy-relevant learning modules
• Leverages near-peer mentors from USC, NYU-Poly, Cooper Union
• Aimed at 3rd-7th grade underserved, underprivileged children and their families

Fast Facts:
• 7270 Students
  • 50% Female / 50% Male
  • 100% Minority Participation
• $1,500,000 Annually
• 2 Urban Science Centers
  • Bronx, NY (serving all boroughs)
  • Los Angeles, CA
• After participating in program, 80% of students interested in pursuing STEM Education/Career

Ongoing Metrics and Assessment
• External Evaluation and longitudinal study of program impact funded through NSF will measure:
  • Student commitment to STEM education
  • Student attitude towards, pursuit of, and involvement in STEM/STEM career
  • Student increase in STEM concepts and content
  • Parent/family awareness and interest in STEM and STEM careers
Iridescent Technovation Challenge

- Entrepreneurial team competition for App development for young women in HS
  - Teams pitch their App and business plan to panel of venture capitalists
  - Winning App is professionally developed and released
  - Each team paired with a female graduate or undergraduate student near-peer mentor
- Partnership with Google, Microsoft, LinkedIn, MIT, Twitter

Fast Facts:

- 730 Students
  - 100% Female
  - 40% Minority Participation
- $850,000 Annually
- After participating in program, 80% of students interested in pursuing STEM Education/Career
- Locations in San Francisco Bay Area, Boston, New York City

Ongoing Metrics and Assessment

- Longitudinal study of program impact funded through NSF will measure:
  - Student commitment to STEM education
  - Student attitude towards, pursuit of, and involvement in STEM/STEM career
  - Student increase in STEM concepts and content
  - Parent/family awareness and interest in STEM and STEM careers
YES! Program

Youth Exploring Science Program
- 4 year, HS program for St. Louis area teenagers, ages 14-18
- Partnership with St. Louis Science Center
- Focus on Minorities, disadvantaged and at-risk students
- Provides academic support and life skills development in a work-based, inquiry-learning science environment

Fast Facts:
- 246 Students
  - 50% Female / 50% Male
  - 90% Minority Participation
- $580,000 Annually
- 84% interested in STEM Career
- 91% pursuing STEM Education/Degree
- Program involves retired Navy personnel, Navy League members, and Naval Reservists as mentors

Ongoing Metrics and Assessment
- High school graduation
- College enrollment
- Career choice
- External Evaluation funded by ONR
  - Track participants over 4 years
  - Evaluate program impact on college and career choices
  - Evaluate understanding of STEM concepts and content
  - Track student participation in other STEM activities
National Math and Science Initiative
• Part of Initiative for Military Families and First Lady’s Joining Forces Initiative
• Providing proven AP STEM curriculum to HS with high percentages of military-dependents
  • AP math and science passing scores increased by 57 percent (7X greater than the national average)
  • Students passing AP exam are 3X more likely to earn college degree

Fast Facts:
• 800 Students
  • 50% Female / 50% Male
  • 26% Minority Participation
  • Schools with 15%+ attendance of Military Dependent Children
• $375,000 Annually
• Currently funding 3 schools in VA and Hawaii, with plans to fund 5 more

Ongoing Metrics and Assessment
• Demographics
• Track students participation in AP courses
• Track student scores on AP tests
• Track student post-secondary choices
SMU CSI Summer Camps
• Week-long camps for middle school students
  • Student learn the science and technology behind Crime Scene Investigation through hands-on activities
  • Students attend presentations from law enforcement and forensic scientists
• CSI-kits provided to teachers for replication of camp activities in their classrooms

Fast Facts:
• 120 Students per summer
  • 50% Male / 50% Female
  • 66% Underserved Participation
• $560,000 Annually
• Includes training for 12 Middle School Teachers
  • Indirect impact of 1,800 students per year
• CSI camp curriculum and materials free to public
  • Posted on Kids Ahead and STEM-Works websites, reaching over 50,000 visitors each year

Ongoing Metrics and Assessment
• Pre- and post-program student perception Survey
• Daily Student and Teacher Surveys
• Post-program Teacher Survey to
• Teacher Follow-up Survey
Higher Education Signature Programs
Naval Research and Engineering Internship Program

- Undergraduate and Graduate students
- Hands-on, experiential research internships at Labs and Warfare Centers alongside scientists and engineers
- Interns exposed to larger Naval S&T community through seminars, tours, and field trips

Fast Facts:

- 155 Students
  - 32% Female / 68% Male
  - 15% Minority Participation
- $1,265,500 Annually
- 19 Locations
- At end of internship, 75% of interns interested in Government S&E Career
- 90% alums pursuing STEM Education/Career
- Program increased student interest in pursuing a career in STEM

Overall Assessment

- Highly Selective – only 11% applicants selected to participate
  - Overall high satisfaction ratings from students and mentors
  - Intern work product adds significant value to Navy S&T

Ongoing Metrics and Assessment

- Track student
- Returning as interns or participate in other Naval STEM programs
- Pursuing STEM Education/Degree
- Employment by Navy Labs
- No formal program review to date – slated for FY 2013
NRL STEM Academy for Minority Institutions

• Undergraduate and Graduate students from HBCUs and MIs
• Hands-on, experiential research internships at Labs and Warfare Centers alongside scientists and engineers
• Interns exposed to larger Naval S&T community through seminars, tours, and field trips

Fast Facts:
• Initiated FY11
• National applicant pool expected
• 45-50 Interns expected
• $330,000 Annually
• Residential program

Planned Metrics and Assessment
• Demographics of applicants and interns
• Selectivity
• Returning as interns or participate in other Naval STEM programs
• Pursuing STEM Education/Degree
• Employment by Navy Labs
University Laboratory Initiative
• Graduate fellowship in STEM
  • Graduate students are paired with a Navy Lab Mentor throughout studies
  • Students have a 10 week research experience in Navy Mentor’s Lab
• Fosters collaboration between Navy Labs and Universities in undersea weapon and vehicle technologies research (NNRs)

Fast Facts:
• 18 students (80 student from all cohorts)
  • 15% Female / 85% Male
  • 15% Minority Participation
• $ 2,200,000 Annually
• 14 States
• 100% alums interested in DoD Career
• 100% alums pursuing STEM Education/Career

Ongoing Metrics and Assessment
• Tracking of student graduation
• Tracking of student employment at Navy Labs
• Tracking of all publications, presentations, and patents resulting from student participation
HBCU Tuskegee University MS Systems Engineering Program

Tuskegee University MS Systems Engineering

- Student awarded one-year scholarship for a MS Systems Engineering with a 3 year work commitment at NAVSEA
- Students exposed to a highly tailored MS of Science Systems Engineering curriculum, emphasizing Navy-relevant technologies
- Enhances Naval Lab workforce diversity through active engagement with HBCU / MI students and faculty

Fast Facts:
- 12 Students
  - 47% female / 53% Male
  - 100% Minority Participation
- Annually
  - $2,300,000 from Section 852 Funds
  - $600,000 from NAVSEA

Overall Assessment
- 33 Graduates, now full time employees
- Employed by 6 Warfare Centers
- 97% completion rate (1 loss)

Ongoing Metrics and Assessment
- Demographics
- MS completion rate
- Work commitment completion rate
- Post-program student surveys
- Employee retention beyond obligated service
**BHEF-Navy Modeling Project**
- Partnership with the Navy will focus on retention of STEM-interested students during first two years of higher education
- Model will validate best practices to ensure retention and identify pathways for students to pursue careers with the Navy
- Model will provide an organized, comprehensive approach to understanding the complex nature of the Naval STEM workforce needs

**Fast Facts:**
- Initiated in FY12
- $300,000 Annually
- BHEF Membership includes
  - Fortune 500 CEOs and executives
  - University Presidents
  - Select Government Leaders
- Model developed by Raytheon in 2009
  - Tracks students from K-16 education into STEM careers
  - Free and available to public

**Goals and Measures of Success**
- Identify potential solutions to strengthen the Navy’s STEM workforce
- Differentiate among the most effective alternatives for Navy investments in STEM education in grades 13-14
Young Investigators Program

- Attracts outstanding new faculty researchers to naval-relevant research
- Encourages young faculty in their teaching and research careers

Fast Facts:

- 25 University Professors in 2012
  - 35% Underrepresented Participation
- $7,975,000 Annually
- 40 States
- 100% pursuing STEM Professionals

Overall Assessment

- 579 Alums over 26 years
- Highly selective – only 6% applicants selected to participate
- 100% alums pursuing Navy-relevant STEM careers
- 60% applied for additional ONR grants
- Many professors work with Navy Warfare Centers

Ongoing Metrics and Assessment

- Demographics
- Post-program professor surveys
- Tracking of additional collaboration with Navy
STEM Learning Center at University of Texas, Pan America

- Collaboration between 5 HSI Colleges & Universities in South Texas
- Center will support professional development for faculty to create 10-15 Navy-relevant STEM courses
- Center will support undergraduate research in Navy-relevant area
- Faculty will develop and standardize curriculum for Texas Pre-freshman STEM outreach program

Fast Facts:
- Initiated in Fall 2011
- $1,000,000 Annually (up to 4 years)
- Collaboration between 5 HSI Colleges/Universities
  - South Texas College
  - University of Texas-Brownsville
  - Texas A&M International University-Laredo
  - Texas A&M University-Corpus Christi
  - University of Texas-San Antonio

Ongoing Metrics and Assessment
- Demographics
- Track student
  - Retention in STEM
  - Graduation with STEM degree
  - Enrollment in graduate school
  - Employment by Navy/DoD Labs
  - Academic achievement (GPA)
- Tracking of all publications, presentations, and patents resulting from student participation
- Tracking of all fellowships, scholarships, and awards received by student participants
Tools and Resources

Gooru
- Gooru is an online STEM resource, organizing free, online education resources into searchable collections
  - Helps students and teachers find high-quality STEM education resources online
- Accessible from any web or mobile platform
- $1,000,000 Annually

Digital Tutor Grand Challenge
- $8,000,000 Grand Challenge issued at Naval STEM Forum in June 2011
  - Phase I: Develop intelligent tool focused on middle school STEM course
  - Phase II: Transition this tool back to Navy in form of STEM literacy tool for new recruits
- Phase I Grand Challenge Award Winners:
  - University of Memphis
  - Arizona State University
  - University of Massachusetts
  - Raytheon BBN Technologies
Media Coverage

Wanted: Whiz kids from the Bronx

"It's about getting kids to explore things on their own with their hands," said Pat Noonan, chief of staff for the Office of Naval Research, a non-profit that sponsored the experiment that was going on. "It's what they're doing in creative science and math."

But it's not all fun and games—according to the Navy, exposing kids in science is critical to our national security. "Our nation has fallen behind in comparison to other countries in producing college graduates in the STEM fields," Noonan said.

Iridescent Posts Videos Of Women Leaders In Technology Talking Mentorship, Career Advice

By Dara Olmeda (Grant Writer & Ethnographer, Iridescent)

Did you miss the Techenovation Challenge's Women in Leadership panel at Anderson Horowitz last month? Iridescent, a non-profit that runs the Techenovation Challenge, Iridescent, teaches high school girls how to design a mobile phone app prototype, write a business plan, and pitch their plan to a panel of venture capitalists.

"It's important to the entire country," Noonan said, pointing out that private-sector industries have leading the world in innovation and feeling the pinch.

To counter that decline, Iridescent and the Navy announced plans to implement a new program that will expose students to science and technology at a young age. "We're going to double funding in targeted education and innovation in order to reach the maximum number of people and have the maximum impact," Noonan added.

Forbes

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The Huffington Post

The internet newspaper: news blogs video community

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The Daily News

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Annual Inventory:
- Began in FY09
- Basic program data across portfolio (number of students, teachers, volunteers)
- Analysis done in spring of each year (FY11 underway)

Four-Part Evaluation Strategy:
- **Baseline Metrics / Output Measures:** All programs currently collect a set of baseline "measures of performance" or "output measures;"
  - Baseline Metrics / Measures of Effectiveness: Beginning in FY12, all programs in which the Navy invests more than $200,000 annually will collect a set of Impact Measures;
  - Return on Investment: In FY12, return on Investment calculations will be developed for programs with the greatest strategic value and highest investment levels; and
  - Formal Program Evaluation: Beginning in FY13, one or two programs will be selected for formal evaluation annually, according to generally accepted evaluation methods.

Metrics Tools:
- Participant Data
- Pre and Post Surveys
- Retention Rates
- Longitudinal Studies
- Collaboration Rates
- Hiring Surveys