



# White Paper

## **Pilot K-12 Science, Engineering, Technology and Workforce for America's Security (SETWAS K-12)**

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**[Non-Profit 501(c)3]**

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**White Paper for Pilot SETWAS K-12: Collaboratory for  
Year-Round Engineering and Science Apprenticeships**

**Briefing Prepared For:**

**RICHARD R. MCNAMARA**  
**Executive Director, PEO Submarines,**  
**NAVSEA**



**SETWAS Discussion at DOD/HBCU Conference in New Orleans, 14 December 2006**

**Left to Right:**

**LCDR Matthew R. Bowman USN, CAPT Yolanda Y. Reagans USN and Dr. James A. Fabunmi (AHDC)**

**PROPRIETARY**

## **Science and Technology for Naval Warfare, 2015--2020**

**Flag Officers  
And  
Senior Executive Service**

**4 October 2005  
The Pentagon Auditorium**



### **Global S&T Trends/1**

- Continued asymmetric opposition to U.S. interests
  - Non-state actors
  - Nation states
  - Military actions
  - Against U.S. critical infrastructure
  - Against U.S. civilian population
- Continued dilution of U.S. S&T base
  - Foreign students outnumber Americans in advanced engineering and science curricula
  - Technical education losing to business, arts
  - Government laboratory positions less attractive
  - Foreign investment in technical education accelerating

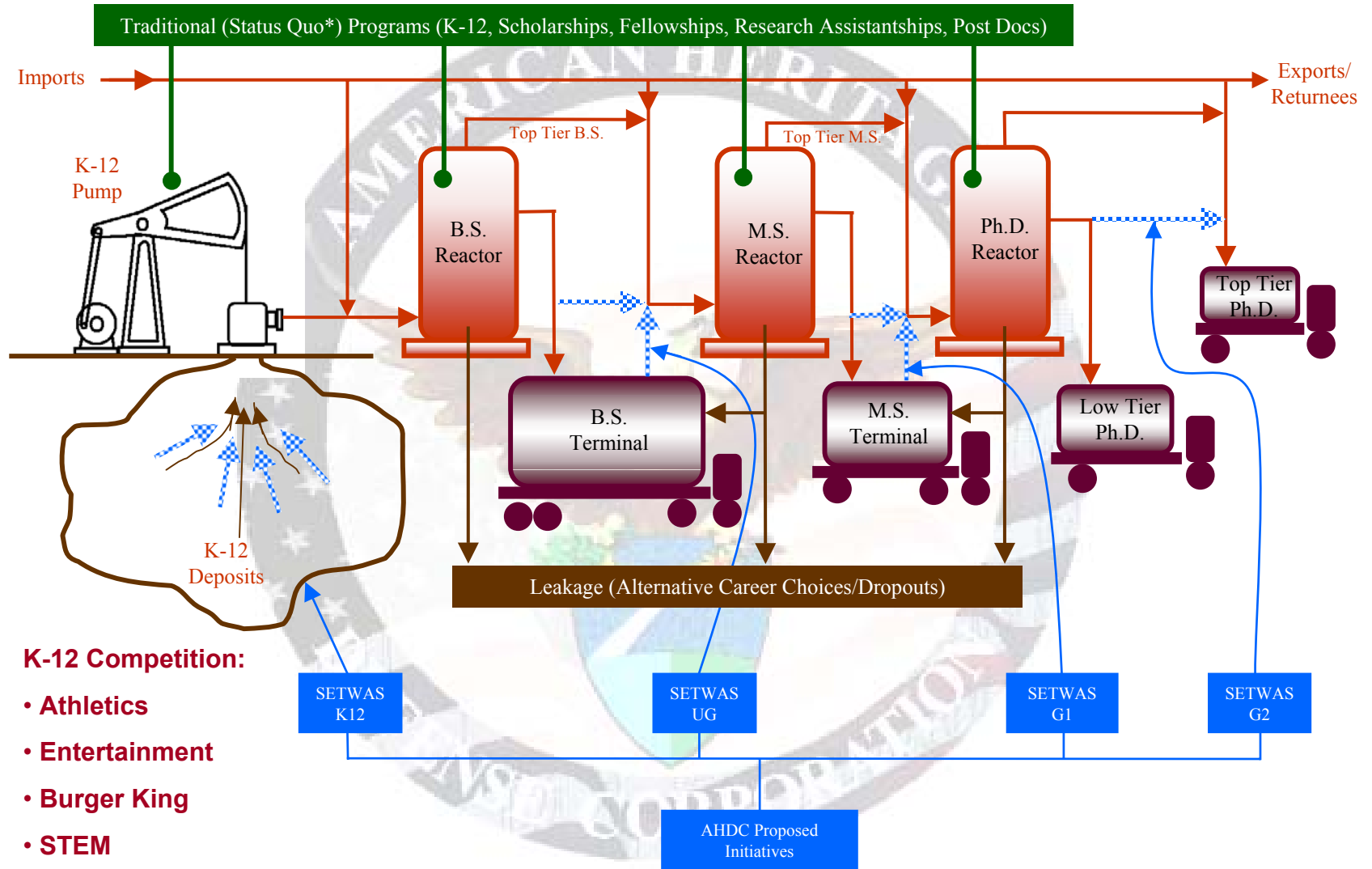


## Findings/3

# Overarching Issues Requirements

- Formal mechanism for assessing U.S. vulnerabilities
- Fundamental understanding of COTS
  - Business models
  - Technology drivers
  - Standards
  - Internal structure, functionality, vulnerabilities
- Long-term program to develop S&T workforce
- Improved coordination of R&D programs
- Requirements-linked, long-range planning process for S&T investment strategy
- NRAC long-range S&T review should be a continuing responsibility

# Competition for Best and Brightest SE&T Minds



# Existing ONR Science & Engineering Apprentice Program (SEAP) For 9G-12G High School Students



**DEPARTMENT OF THE NAVY**  
**ONR**  
Science & Technology

## OFFICE OF NAVAL RESEARCH

### SCIENCE & ENGINEERING APPRENTICE PROGRAM (SEAP)

Home  
Program Details  
» Participating labs  
Contacts  
FAQ  
Apply online

#### Participating labs

- [Armed Forces Radiobiology Research Institute](#) (Bethesda, MD)
- [Naval Air Warfare Center/Aircraft Division](#) (Patuxent River, MD)
- [Naval Medical Research Center](#) (Silver Spring, MD)
- [Naval Research Laboratory](#) (Washington, DC)
- [Naval Research Laboratory](#) (Stennis Space Center, MS)
- [Naval Research Laboratory](#) (Monterey, CA)
- [Naval Surface Warfare Center/Carderock](#) (Bethesda, MD)
- [Naval Surface Warfare Center/Philadelphia](#) (Philadelphia, PA)
- [Naval Surface Warfare Center/Dahlgren](#) (Dahlgren, VA)
- [Naval Surface Warfare Center/Indian Head](#) (Indian Head, MD)
- [Naval Surface Warfare Center](#) (Panama City, FL)
- [Naval Undersea Warfare Center/Newport](#) (Newport, RI)
- [US Naval Academy](#) (Annapolis, MD)
- [US Naval Observatory](#) (Washington, D.C. and Flagstaff, AZ)
- [Uniformed Services University of the Health Sciences](#) (Bethesda, MD)
- [Space and Naval Warfare Systems Center](#) (San Diego, CA)

...spend 8 weeks during the summer...

## Eligibility Requirements

- High school students who have completed at least Grade 9. A graduating senior is eligible to apply
- Must be 16 years of age for most laboratories. Some laboratories may accept a 15 year old applicant. Please check individual lab description for more details.
- Applicants must be US citizens and participation by Permanent Resident Aliens is limited. Please check individual lab description for participation of Permanent Resident Alien.

## Award Duration and Stipend

- Participating students spend 8 weeks during the summer doing research. Program dates are fixed and cannot be changed. Students are expected to participate 8 continuous weeks. No vacation time is allowed during these eight weeks.
- It is strongly recommended to apply to laboratories that are close to your residence. No travel/relocation allowance will be provided.
- The stipend amount for students will be \$1500 for the 8 weeks, which will be paid in two installments. Returning students will receive \$1550 for the 8 weeks. The first check will be distributed in the middle of the internship and the second check at the end of the internship.

...\$1500 for the 8 weeks....

= \$4.69/hr.

DC Minimum Wage = \$7.00/hr

# Proposed Approach – Establish Apprenticeship Collaboratory

Mentor ↔ Mentor  
Mentor ↔ Apprentice  
Apprentice ↔ Apprentice  
Group Interactions

“a Collaboratory is more than an elaborate collection of information and communications technologies; it is a new networked organizational form that also includes social processes; collaboration techniques; formal and informal communication; and agreement on norms, principles, values, and rules” (Cogburn, 2003 Interactions, 10(2), 80-87, New York: ACM Press.)

Cyber Infrastructure Tools:  
Communication, Groupware  
Services, Broadband Wi-Fi

Across Multiple Institutions,  
Government Laboratories,  
Industry Facilities

Distributed, Ubiquitous  
Media-rich Information  
Technology

Access to Information

Digital Libraries,  
Electronic  
Publications,  
Electronic Notes,  
“Wiki” Web Pages

Access to Facilities  
Remote Experimentation

Interaction with the  
Physical World

# SETWAS K-12 : Pilot Program



**ON-SITE AT NAVY LABORATORY**



**OFF-SITE VIA COLLABORATORY**

**Collaboratory for Year-Round Engineering and Science Apprenticeships**

**What is a Collaboratory?** It is a web-based collaboration site that will allow Navy mentors and their student apprentices to remotely create and use collaboration workspaces containing areas for defining and viewing tasks, deadlines, and status as well as real-time audio and video conferencing and editable spaces that teams can use to update and exchange documents. While off site at locations separated by distance from the Navy laboratory, the students will be able to interact with their mentors and continue to function as apprentices all the way through graduation.

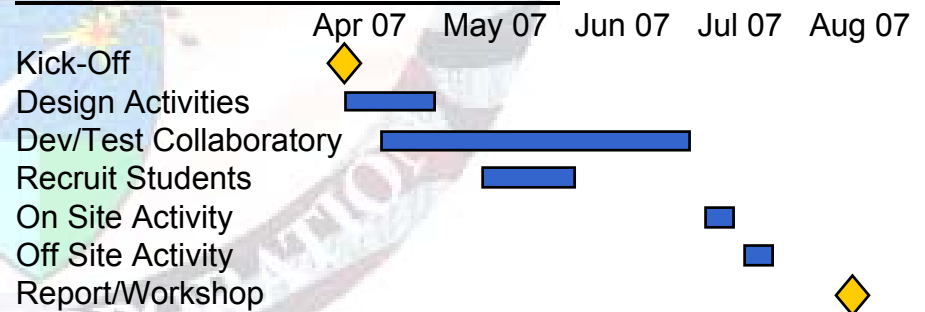
**Impact:** The best and brightest high school students who sign up for Navy science and engineering apprenticeships will not need to terminate their involvement at the end of their summer vacation periods. They will be able to remain engaged in these activities year round, thereby improving the yield for future Navy workforce.

**Goal:** Science, Engineering, Technology and Workforce for America's Security (SETWAS) K-12 program will extend Navy's apprenticeship programs to a year-round activity to capture and keep the best and brightest students across all demographic groups interested in science, engineering and technology careers.

**Objective of Pilot Program:** To demonstrate the application of Collaboratory tools for implementing SETWAS K-12 program

**Approach:** Conduct a Two – Week Apprenticeship Activity for selected high school students during the summer. One week on-site at Navy Laboratory, and another week offsite via Collaboratory network.

## Tasks and Schedule of Deliverables:



**Budget:** \$50K Firm Fixed Price.



## **Proposing Organization:**

The SETWAS K-12 Pilot effort is proposed by The American Heritage Defense Corporation (AHDC), a 501(c)3 Non Profit Research and Development Corporation, chartered in the District of Columbia to provide public service in the area of science, engineering, technology and workforce development in support of governmental, industrial, academic and commercial establishments.

## **Program Manager:**

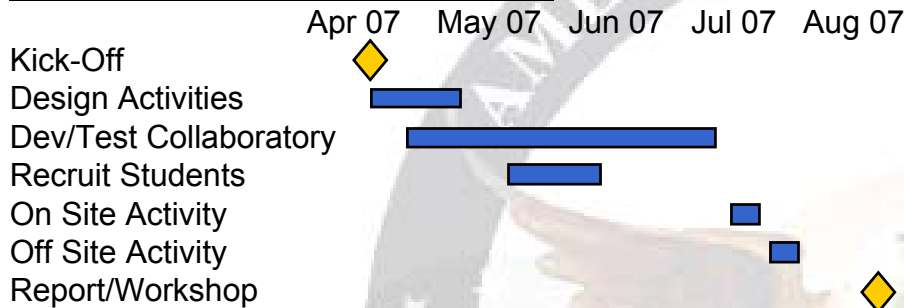
This effort will be performed under the direction of Dr. James A. Fabunmi, AHDC Principal Research Scientist. Dr. Fabunmi received his Ph.D. degree in Aeronautical and Astronautical Engineering from Massachusetts Institute of Technology in 1978. Since then he has been active in various aspects of Aerospace Engineering, including Academia, Industrial Research and Development, and Consulting. His professional experience has afforded him specific insights to opportunities for enhancing the training and preparation of Science and Technology workforce.

## **Partners:**

The proposed program will benefit from partnerships with leading experts in the field of Collaboratory tools development, as well as organizations in Prince George's County Maryland engaged in summer programs for high school students in the County.

# PROPRIETARY BACK-UP CHART

## Tasks and Schedule of Deliverables:



## Budget Estimates: (preliminary – subject to change)

**Kick-Off** – One day conference in DC (Travel & per diem for out of town attendees) = \$2K

**Design Activities** – (Two weeks duration x ¼ Senior Personnel) = \$3K

**Dev/Test Collaboratory** (Off the shelf items/necessary hardware/integration effort/necessary development work) = \$24K

**Recruit Students** – (Two weeks duration x ¼ Support Personnel) = \$1K

**On Site Activity** - (1 week x 5 student stipends/transportation expenses) = \$2.4K

**Off Site Activity** - (1 week x 5 student stipends) = \$1.6K

**Report/Workshop** - One day conference in DC (Travel + per diem for out of town attendees + Report Expenses) = \$3K

**Promotional Expenses** - (Audio/Video Production of Demonstration Project) = \$5K

**Indirect Expenses** – (Overhead/G&A) = \$8K

**Estimated Total:** \$50K

# AHDC Business Matrix

Business Units	Customers	Products & Deliverables	Funding
SETWAS Alliances	<ul style="list-style-type: none"> <li>• HBCUs/MIs</li> <li>• Industry Primes</li> <li>• Federal Agencies</li> <li>• FFRDCs/Other IHEs</li> </ul>	<ul style="list-style-type: none"> <li>• Promotion/Planning</li> <li>• Management/Consulting</li> <li>• Marketing/Projects</li> <li>• Collaboratories</li> </ul>	<ul style="list-style-type: none"> <li>• Fees</li> <li>• Grants/ Endowments</li> <li>• Contracts</li> </ul>
SETWAS K-12 Apprenticeships	<ul style="list-style-type: none"> <li>• Federal Agencies</li> <li>• Private Industry</li> <li>• School Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Promotion/Planning</li> <li>• Management/Consulting</li> <li>• Placements/Collaboratories</li> </ul>	<ul style="list-style-type: none"> <li>• Fees</li> <li>• Grants/ Endowments</li> <li>• Contracts</li> </ul>
SETWAS UG Internships	<ul style="list-style-type: none"> <li>• Federal Agencies</li> <li>• Private Industry</li> <li>• HBCUs/MIs/Other IHEs</li> </ul>	<ul style="list-style-type: none"> <li>• Promotion/Planning</li> <li>• Management/Consulting</li> <li>• Placements/Collaboratories</li> </ul>	<ul style="list-style-type: none"> <li>• Fees</li> <li>• Grants/ Endowments</li> <li>• Contracts</li> </ul>
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VI-STEM	<ul style="list-style-type: none"> <li>• HBCUs/MIs</li> <li>• Other IHEs</li> <li>• Federal/Industry Labs.</li> </ul>	<ul style="list-style-type: none"> <li>• Promotion/Planning</li> <li>• Management/Consulting</li> <li>• Collaboratories</li> </ul>	<ul style="list-style-type: none"> <li>• Fees</li> <li>• Grants/ Endowments</li> <li>• Contracts</li> </ul>

## LEGEND:

SETWAS = Science, Engineering, Technology and Workforce for America's Security

K-12 = Kindergarten – 12<sup>th</sup> Grade; UG – Undergraduate; G- Graduate; FFRDCs = Federally Funded R&D Centers

VI-STEM = Virtual Institute for Science, Technology, Engineering and Mathematics

HBCUs/MIs = Historically Black Colleges and Universities/Minority Institutions; IHEs = Institutions of Higher Learning