K-12 Outreach

Creating the Next Generation of Naval Architects, and Marine, Ocean, and Naval Engineers
Generating Interest in Science through Hands-On Activities
The Current Situation

- Decreasing College Enrollment in Engineering – US has fallen from 3rd to 17th
- Lack of Skilled workers, decreased global competitiveness
- 400,000 engineers will be needed by 2010
“A Gathering Storm”

US Government concluded:

• Recruitment vulnerability in Naval Architecture, Marine and Naval Engineering resulting in lack of expertise in mission-critical areas.

• A lack of quality technical education will ultimately result in a decrease in the level of competitiveness for the country
US Government Response

• Create the National Naval Responsibility for Naval Engineering (NNRNE) to fund K-12 Outreach projects

• Funded by the Office of Naval Research (ONR)
Goals

• Generate More Engineering and Technical Students
• Promote Learning through Hands-On Activities
• Reach out to under-represented groups of children
One Solution: SEAPerch

**What is it?**

- Underwater Robotics Program developed by MIT Sea Grant
- Introduces students to engineering and robotics by building and operating an underwater “ROV”
Program

- Students learn design and engineering principles by building an underwater ROV (Sea Perch) and participating in a culminating event/Design Competition or Showcase
  - Fun, educational, challenging
  - Varying levels of sophistication allow broad appeal
  - Integrate engineering & technology into the classroom
  - Introduce maritime careers into the classroom
- MIT-designed curriculum, simplified & affordable design.
- Low Cost Per Student – From $50.00 to $100.00 per student (Admin costs not included)
- Website – www.seaperch.org provides resources
- SNAME/ONR manages, assembles & distributes material, kitting, tools
- No-Cost Teacher Training conducted by MIT
Plans

• ONR has provided a 5-year grant to SNAME to develop Sea Perch into a national program, reaching students across the country, beginning with locations that are home to a Naval base or facility, or in a coastal or shipping area. In the first 9 months of the grant, close to 2,000 students are now participating in Sea Perch in the DC, Philadelphia and Washington State area. 1,500 of those students were from NEW schools to the program, generated by this grant.
Regional Approach

• The plan entails a regional approach, beginning with the Washington, DC, Virginia, and Maryland area, and expanding into various regions that have a critical mass of what it will take to make the program successful, and self-sustaining:

School district interest, university interest, local industry interest, professional society interest, and local government/military presence.
Path to Growth

- The goal of the program will be to introduce the program to a region, help build the program utilizing the SNAME/ONR model, assist with marketing and public relations to generate awareness and interest, and finally, and most importantly, encourage and support the region to take the initial funding for kits and assistance, and raise funds to make the program self-sustaining.
Ultimate Goal

• Self-Sustaining Program

With each region/area’s successful stand-up of the program, and as programs become self-sustaining, the opportunity to move to the next area with funds and assistance creates the ability to grow the program.
SEAPerch in the Classroom

- Teaches basic engineering skills such as building
- Teaches science and engineering concepts
- Discusses future courses to take on similar topics
- Discusses career options
- Encourages conversation about contributions of women and minorities to the field
Design Competitions

- Takes what they learn to the next level
- Encourages team spirit
- Fosters an end-goal
- Rewards creativity
- Rewards sportsmanship, spirit and presentation skills
Sea Perch Challenge

- Vehicle Performance
  - Maneuvering (obstacle course)
  - Recovery
  - Advanced Recovery
  - (recovery with underwater camera)
- Innovative Design
  - $15 budget for design enhancement (optional)
- Team Presentations
  - Student sales team oral presentation
  - Convince clients (judges) that their product is superior design
- Design Notebooks
  - Document planning, design, construction, testing & learning
- Team Spirit & Sportsmanship
  - Team flag, cheering, posters, mascot, etc
Competition Day Pictures
Program Ideas

• Integrate into curriculum based upon learning outcomes
• Include in the Gifted and Talented Program
• Consider as an after-school program activity
• Offer as part of a club (Robotics, Science)
How You Can Help

- Mentor a Class or School
- Volunteer on Competition Day
- Help raise funds
- Help raise awareness
- Help assemble the kits
Support

• Susan Giver, Director of Outreach
  The Society of Naval Architects and Marine Engineers
  ONR Partner on SEAPerch

• MIT Teacher Training
  – Teach it
  – Build it
  – Curriculum and Lesson Plans

• ONR Financial Support

• SEAPerch.org

• Long-term Corporate Sponsorships
Questions/Discussion

Thank you for your time!