

Ecybermiss10thn



ACCEPT THE CHALLENGE
DECADE OF STEM INNOVATION AND INSPIRATION



2011-2012
**ANNUAL
REPORT**

**A Decade of
STEM
Innovation and
Inspiration**

eCYBERMISSION 2011-2012

- Introduction..... 1
- Competition Snapshot..... 2
 - Highlights..... 4
- Year in Review
 - Registration Period 6
 - Outreach 8
 - Submission Period..... 12
 - Judging..... 14
- Volunteer Awards..... 16
- 2011-2012 National Judging and Educational Event.....
 - Highlighted Events..... 18
 - National Finalist Teams..... 23
 - National Winning Teams 27
- Looking Forward 28

eCYBERMISSION
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Introduction

The 2011-2012 eCYBERMISSION competition year was a milestone for the program and the U.S. Army, as we celebrated 10 years of dedication to today's youth and their interest and participation in science, technology, engineering and mathematics (STEM). eCYBERMISSION has evolved over the last decade to become one of the nation's leading STEM competitions, encouraging students from across the nation, and in Department of Defense (DoD) and Department of State (DoS) schools across the world, to take an active role in their education and to experience the innovative world of STEM in an immersive and memorable way. This year, we were pleased to have more students, Volunteers and returning Team Advisors than any previous year. We were delighted to recognize more than 900 students at the state, regional and national level for their extraordinary eCYBERMISSION projects. We look forward to seeing each of these students continue their passion for STEM in the years ahead.

The 2011-2012 eCYBERMISSION Annual Report highlights the many achievements of the eCYBERMISSION Program throughout the competition year, from the registration period to the culminating experience of the National Judging and Educational Event (NJ&EE) at which we announced the 2012 national winning teams. Each period of the competition year is crucial to the competition's success as we work to secure registrations from as many students as possible, place them on eligible teams and guide them through the submission of their final projects. Our Virtual Judges then play the vital role of scoring the projects and identifying the eCYBERMISSION Winning Teams at the state level. The success of the 2011-2012 competition was largely because of the thousands of dedicated Team Advisors and Volunteers who work tirelessly to encourage today's youth and the students who demonstrate such hard work and dedication to their STEM education.

Since the program's inception in 2002, eCYBERMISSION almost 100,000 students have participated worldwide. In addition, the U.S. Army has awarded almost \$9 million in savings bonds to students to contribute to their college funds and continue their STEM education. As we continue to grow and enhance the eCYBERMISSION Competition, we look forward to realizing the potential that lies within our country's students.

Louie Lopez
eCYBERMISSION Program Manager
U.S. Army Research, Development and Engineering Command



- 10
Years
- 100,000
Students
- \$9,000,000
Awarded



2011-2012 eCYBERMISSION Competition Snapshot

The 2011-2012 eCYBERMISSION registration period marked the beginning of the 10th year of the competition, and a decade of commitment to STEM education by the eCYBERMISSION Program.

More than 15,400 students registered from across the United States, and in Department of Defense Education Activity (DoDEA) and Department of State schools across the world.

This was also a banner year for Team Advisor retention, with more than 50 percent of Team Advisors returning from previous competition years to lead at least one team.

In addition, the number of Volunteers who support the program and help make it a success increased significantly this year, with more Virtual Judges, CyberGuides and Ambassadors than ever before. Their tireless support of eCYBERMISSION helped make the 2011-2012 competition year a success!

What is eCYBERMISSION?

eCYBERMISSION is a web-based STEM competition for students in grades six through nine, designed to encourage students to become more actively engaged in their STEM education. eCYBERMISSION strives to encourage students from all backgrounds and proficiency levels to understand how to apply what they learn in the classroom to a real life situation, promoting self-discovery through hands-on learning. Students work in teams to identify a problem in their community and utilize the scientific method/inquiry or the engineering design process to propose a solution, learning the value of teamwork and community service. Students compete for state, regional and national awards, and students on winning teams can win up to \$8,000 in U.S. savings bonds and a chance to attend NJ&EE in the Washington, D.C., Metropolitan Area.

Highlights from the year

Inclusion of the Engineering Design Process

Since the program's inception, many teams have submitted engineering-related projects. With the addition of the Nanotechnology and Robots and Robotics mission challenges, we saw an increase in projects of this nature. With recommendations from Team Advisors, National Judges and CyberGuides, the 2011-2012 competition year introduced the engineering design process to the program, allowing those teams who choose to complete an engineering project to complete their mission folder according to the engineering design process, rather than the scientific method. The introduction of these mission challenges ensures better project representation and appropriate evaluation of mission folders.

Awards Structure

The eCYBERMISSION competition offers significant incentives to encourage STEM achievement.

State Winning Teams: Each student on a first place state team receives \$1,000 in U.S. Series EE savings bonds (matured value); each student on a second place state team receives \$500 in U.S. Series EE savings bonds (matured value).

Regional Winning Teams: The top four teams in each grade at the state level move onto the regional competition. Each student on a Regional Winning Team receives an additional \$2,000 in U.S. Series EE savings bonds (matured value) and moves onto national competition.

National Winning Teams: The top team in each grade level from each region complete in the National competition. Each student on a National Winning team receives an additional \$5,000 in U.S. Series EE savings bonds (matured value).

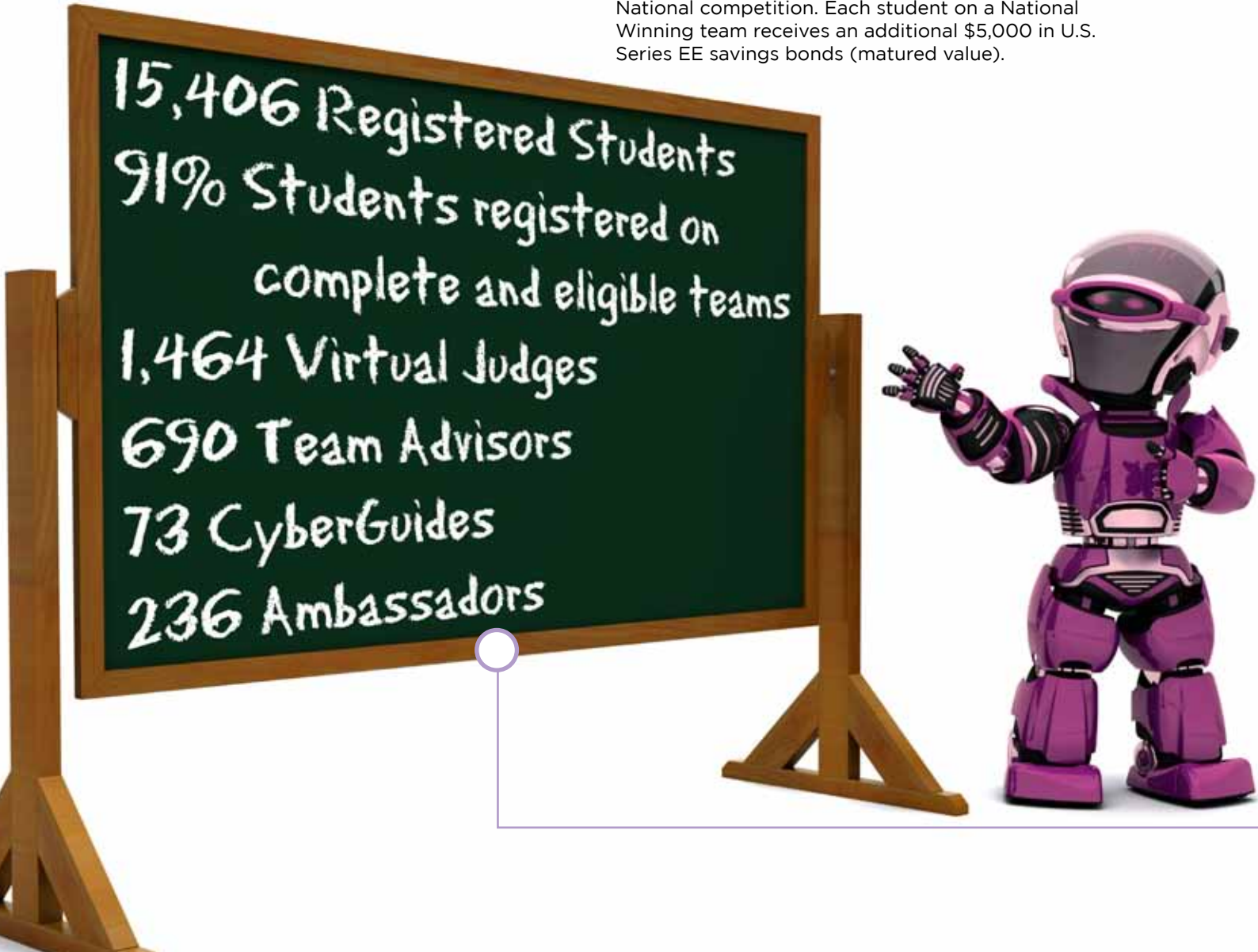
Enhanced Regional Judging Process

Recommendations made by educators, team advisors and participants during the 2010-2011 competition year were incorporated into the 2011-2012 competition year, establishing a more rigorous regional judging process. In order to differentiate the state competition from the regional competition, and to more closely mirror national judging, a regional judging panel was nominated by and selected from various Research, Development and Engineering Centers (RDECs) from across the country to review and score the regional finalist teams' projects. The 64 regional finalist teams were required to submit an abstract of their mission folders to the regional judges, and each held a teleconference to present to a regional judging panel. Each team gave a two-minute oral presentation followed by a three-minute question and answer session with the regional judging panel. This constituted a parallel process to national judging, in which students' written and verbal skills in presenting their project are key criteria.

The regional judges provided a score for each team based on the application of the scientific method/inquiry or engineering design process (60 points), benefit to the community (18 points), team collaboration (12 points), and written communication (10 points). The regional judging scores were then averaged with the teams' mission folder scores. The teams with the highest average scores from each grade and region were selected as regional winners, who would advance to the national level of the competition.

10th Annual National Judging and Educational Event

The 2012 NJ&EE was the crowning achievement of the 10th Annual eCYBERMISSION competition. The event was highlighted by special appearances by Michael and Geoffrey Howe from the popular Discovery Channel show "Black Ops Brothers"; visits to Smithsonian museums and a tour of monuments on the National Mall; interviews with Dr. Kiki Sanford for her weekly live broadcast, "This Week in Science"; and a keynote address by Dr. Arun A. Seraphin, Principal Assistant Director for National Security and International Affairs at the White House Office of Science and Technology Policy. Another highlight of NJ&EE was the STEM Tech Expo during which scientists and engineers from the U.S. Army Research, Development and Engineering Command (RDECOM); the U.S. Army Medical Command (MEDCOM); U.S. Army Test and Evaluation Command (ATEC); and the U.S. Army Corps of Engineers (USACE) conducted hands-on experiments with students, demonstrating the advanced technologies of the U.S. Army and the many applications of STEM education.



15,406 Registered Students
91% Students registered on
complete and eligible teams
1,464 Virtual Judges
690 Team Advisors
73 CyberGuides
236 Ambassadors

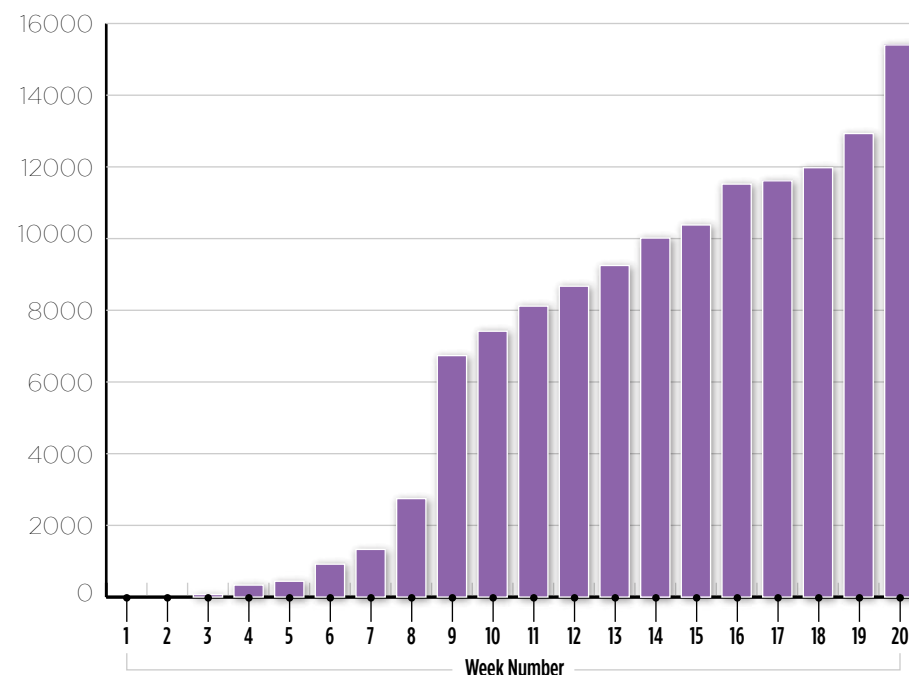
eCYBERMISSION by the Numbers

Yearⁱⁿ Review

Registration Period

The eCYBERMISSION registration runs from August through mid-December, and enables students and Team Advisors to register for the competition during the first half of the traditional school year. Volunteers are also recruited during this time, as they play a significant role in the success of the program throughout the competition year. Marketing and communications tactics were employed to encourage early student registration, inclusive of early registration incentives distributed to complete teams that registered by Sept. 30, 2011. Increased outreach led to an additional 2,465 students in the final week.

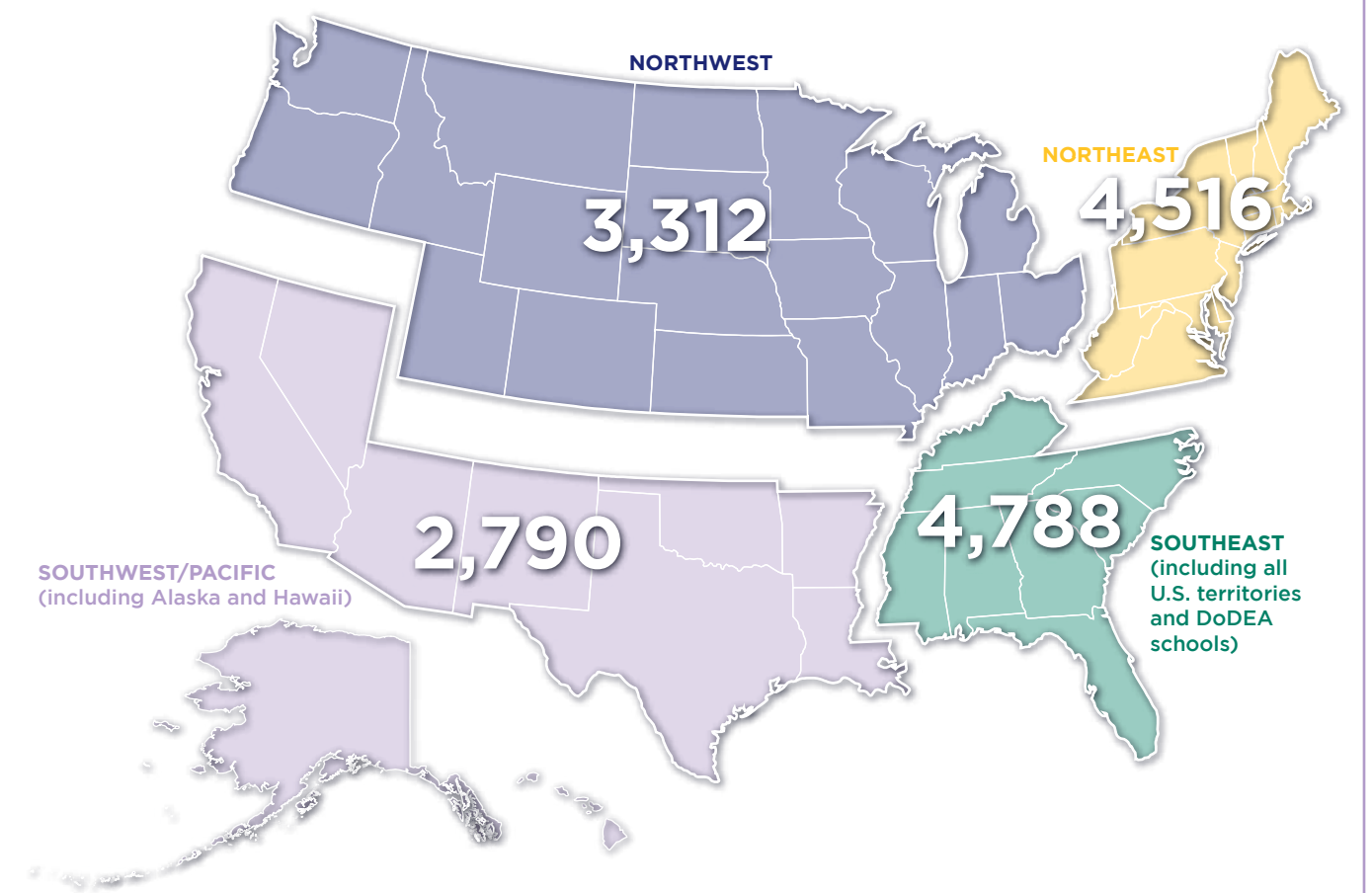
2011-2012 Student Registrations by Week



A record 15,406 students registered for the eCYBERMISSION competition this year. Additionally, the Team Advisor retention rate reached just greater than 50 percent, and 3,949 complete teams competed—both program records.

In the 2011-2012 competition year, eCYBERMISSION registered students in every state except Rhode Island. Students registered in three U.S. territories (American Samoa, Guam and Virgin Islands), and 237 students registered from DoDEA schools in Armed

Forces Europe and Armed Forces Pacific. This year, 43 states and U.S. territories had an increase of registered students compared with the 2010-2011 competition year. These numbers are a direct result of the dedication and determination of the teachers and youth leaders who serve as Team Advisors and play an integral role in the continued success of the eCYBERMISSION Program.



Geographical Location of Registered Students

Volunteers

2011-2012 also saw the largest number of Volunteers in the program's history, with 1,773 Ambassadors, CyberGuides and Virtual Judges registered. This is a 25 percent increase in Volunteer participants from last year. Volunteers are vital to the success of eCYBERMISSION, increasing the impact of the competition in communities nationwide from registration through judging.

Ambassadors serve as the "face of eCYBERMISSION" by promoting the competition and recruiting both students and Volunteers in their communities.

CyberGuides provide online assistance to eCYBERMISSION students through the use of discussion forums, chat rooms, instant messaging and interactive webinars.

Virtual Judges evaluate and score team Mission Folders via the eCYBERMISSION web site.

Registered Volunteers

Ambassadors	236	Cyber Guides	73	Virtual Judges	1,464
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Outreach

Outreach is crucial to the success of the eCYBERMISSION program. In-depth analysis of past registration trends and participant recommendations prompted strategic outreach initiatives for 2011-2012, focusing on strategic contacts in local communities, national organizations, and key states to increase program participation.



Outreach Initiatives

The eCYBERMISSION team conducted 25 events in 13 states as part of its strategic outreach plan for the 2011-2012 competition. Exhibiting and presenting at key conferences focusing on STEM education, gifted and talented curriculum and U.S. Army events allow eCYBERMISSION staff to generate targeted awareness of and interest in the competition among targeted audiences, as well as the opportunity to network with the educational community.

eCYBERMISSION was represented at the following events:

STEM Outreach Events

Black Engineer of the Year STEM Global Competitiveness Conference, Washington, D.C.
2011 Innovative STEM Conference, Baltimore, MD
Science and Technology Education Partnership 12 Conference, Riverside, CA
National Science Teachers Association (NSTA) Regional Conference*, Hartford, CT
NSTA Regional Conference*, New Orleans, LA
Association for Career and Technical Education Annual Convention and Expo, St. Louis, MO
Robotics, Engineering and Technology Week, Warren, MI
Hispanic Engineer National Achievement Awards Corporation Conference, Orlando, FL
Futures 11, Bel Air, MD
Girl Scouts of Los Angeles: Girltopia, Los Angeles, CA
Boys and Girls Club of America Annual Conference*, New Orleans, LA
GEAR UP Capacity Building Workshop*, Orlando, FL

25 Outreach Events

13 States

Gifted and Talented Curriculum

Maryland State Gifted and Talented Meeting*, Columbia, MD
Maryland State Conference on Gifted and Talented Education*, Greenbelt, MD
Association for Supervision and Curriculum Development Conference, San Francisco, CA
Maine Educators of the Gifted and Talented, Augusta, ME
Association of Independent Maryland Schools Annual Conference, Baltimore, MD
National Middle School Association Conference, Louisville, KY

U.S. Army

Edgewood Middle School 8th Grade Career Fair, Edgewood, MD
APG Armed Forces Day Celebration, Aberdeen Proving Ground, MD
West Point STEM Workshop*, West Point, NY
Patriots Technology Training Center Annual Youth Summit on Technology, Springdale, MD
Military Child Education Coalition Conference, Nashville, TN
Aberdeen Proving Ground (APG) Arbor Day Celebration, Aberdeen Proving Ground, MD
Take Our Daughters and Sons to Work Day, McLean, VA

Registration Outreach

One of the most notable accomplishments for the 2011-2012 registration period was the increase in student participation in states with previously low registration rates. Strategic outreach efforts targeted low registration states directly by reaching out to middle schools and STEM academies, faculty, academic contacts, and more than 200,000 STEM coordinators. The strategic communications campaign provided specifically tailored information about the eCYBERMISSION program, updates on the competition, important dates and deadlines, and encouraged registration in an effort to establish the program as a relevant STEM education resource to target audiences.

These combined efforts resulted in an increase in student participation in 18 out of 20 low registration states. These increases account for greater than 11 percent of the total number of registered students.

Ambassadors

Ambassadors are a vital component to the success of eCYBERMISSION and increasing student participation. These Volunteers from across the country reach out to their communities by providing information about the competition and encouraging schools and organizations to get involved. With a record 236 Ambassadors participating this year, 2011-2012 marked a 55 percent increase over the 2010-2011 competition year, and an increase of 165 percent over the number of Ambassadors in 2009-2010. Ambassadors were instrumental in increasing participation in previously low registration states such as Alaska, California, Georgia, Hawaii, Iowa, Massachusetts, Michigan, Missouri and Washington.

U.S. Army Chief of Staff Gen. Ray Odierno (center) meets 2011 eCYBERMISSION national finalists "Dr. Med" from San Antonio during his tour of the Army Strong Zone at the Army's All-American Bowl. Team members Jocelyn Hernandez, Nathaly Salazar, Carlos Zapata and Ricardo Rodriguez were touring the Army Technology Zone with team advisor Sandra Geisbush.



* Indicates when eCYBERMISSION staff gave a presentation to conference attendees

Webinars

The eCYBERMISSION team offered a robust webinar schedule throughout the registration period, designed to reach participants nationwide. All Webinars were reorganized for the 2011-2012 competition year to meet the unique needs of stakeholders and participants. This year's webinar topics were: Introduction and Overview Webinar for anyone interested in participating, Team Advisor-Focused Webinar, and Student-Focused Webinar.

Online Outreach

Social media and other online communications outlets enable the eCYBERMISSION program to have increased visibility among certain audiences that might not be reached through traditional campaigns. This tactic is an effective way to recruit students, Team Advisors and Volunteers.

- » eCYBERMISSION advertised on Facebook for the second year for 43 days in January and February 2012. This advertisement allowed eCYBERMISSION to reach a targeted audience based on an individuals' interests and produced 549 clicks. Sixteen Virtual Judges registered through the use of social media sites and advertisements this year. Partner organizations used Army Knowledge Online, a web-based enterprise information service that reaches more than 2.2 million U.S. Army and Department of Defense customers, to recruit possible Volunteers at no cost to the program.
- » The American Military University promoted the Virtual Judge Volunteer role on its Facebook and alumni pages. In total, 31 Virtual Judges registered because of this effort.
- » eCYBERMISSION promoted the Virtual Judge Volunteer role on Volunteer Match, a new social media networking site that has facilitated more than 620,000 volunteer connections since its debut.

Volunteer Road Shows

Volunteer road shows are strategic collaborative outreach initiatives between the eCYBERMISSION team and partner organizations for the purpose of increasing volunteers. Most roadshows occur at universities and military installations and are designed to promote the eCYBERMISSION Program to recruit Volunteers.

During the 2011-2012 competition, the eCYBERMISSION team, in collaboration with partner organizations, hosted road shows at the following locations:

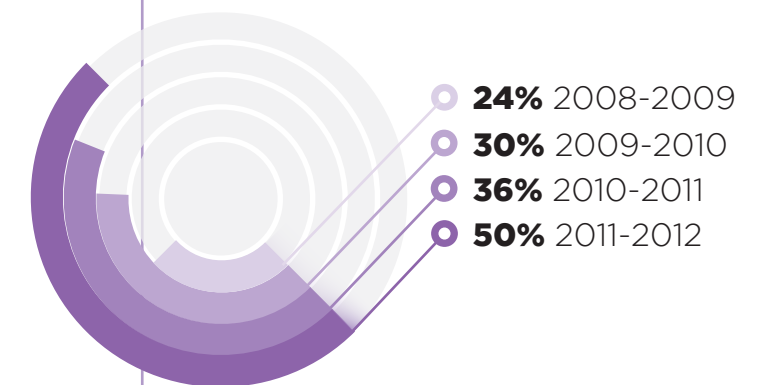
- » U.S. Army Research, Development and Engineering Command (RDECOM)
 - » Armament Research, Development and Engineering Center (ARDEC)
 - » Communications-Electronics Research, Development and Engineering Center (CERDEC)
 - » Edgewood Chemical Biological Center (ECBC)
 - » Natick Soldier Research, Development and Engineering Center (NSRDEC)
 - » Tank Automotive Research, Development and Engineering Center (TARDEC)
- » U.S. Army Engineer Research and Development Command (ERDEC)
- » U.S. Army Test and Evaluation Command (ATEC)
- » Morgan State University
- » Maryville University

CERDEC and ECBC showed tremendous support for the program and secured dozens of Volunteers for the 2011-2012 competition year. Two road shows were held at CERDEC, resulting in 142 Virtual Judge registrations. The road shows produced a total of 230 Virtual Judges, which accounts for 30 percent of the total number of registered Virtual Judges (excluding United States Military Academy student registrations).

Team Advisor Retention

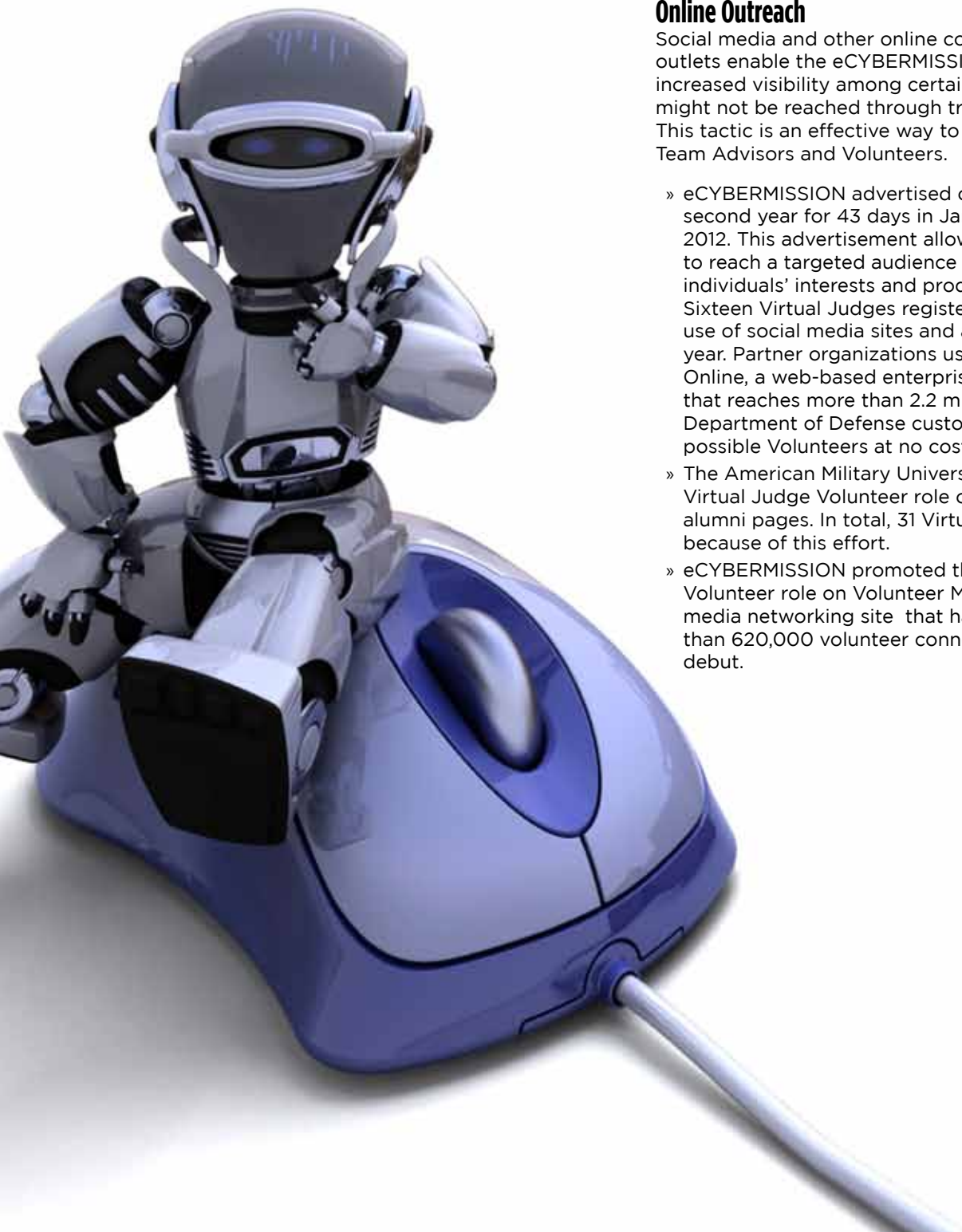
Retention efforts were a major focus in 2011-2012, with the eCYBERMISSION team increasing the frequency of call and personalized email campaigns to previous Team Advisors. As a result, eCYBERMISSION recorded the highest rate of returning Team Advisors in the program's history at more than 50 percent. The retention call and email campaign is used to determine the participation status of previous Team Advisors. It also to enable the eCYBERMISSION team to discuss any limitations or projected impediments that might discourage them from participating again, and to allow an opportunity to potentially resolve these concerns.

Team Advisor retention has consistently grown during the last several years, and this year far exceeded the previous year's retention rates.



230 Virtual Judges

30% of all registered



Submission Period

Once eCYBERMISSION participants are registered to a complete and valid team, they may begin to work on their Mission Folder and initiate submitting their project. The number of submitted Mission Folders remained strong for the 2011-2012 Competition Year.

The success of the 2011-2012 Submission Period can be attributed to the continuation of a personalized approach in recruiting Team Advisors. The eCYBERMISSION team leveraged programmatic email blasts, Mission Folder Tips and worksheets, phone call campaigns, CyberGuide webinars, and provision of web site information, social media resources, and other competition resources to increase the Mission Folder submission rate.



Submission Campaign

A comprehensive strategic outreach plan was launched to provide support and resources to Team Advisors from the moment their students registered until they submitted their Mission Folders. Tactics included:

Mission Folder Tips

To help Team Advisors keep their students on track when completing each phase of the Mission Folder and corresponding worksheets were provided weekly to share with their students. eCYBERMISSION offered nine Mission Folder tips because of their popularity and effectiveness. These tips guided teams through each step of the scientific method/inquiry or engineering design process and Mission Folder phases.

Each Mission Folder tip was delivered with a corresponding worksheet to further encourage students to exercise the content they reviewed.

Key messages for the Mission Folder Tips

- Investigative Techniques
- Selecting a Topic
- Creating your Mission Plan
- Constructing a Hypothesis
- Conducting Research and Citing your Sources
- Testing your Hypothesis
- Writing a Scientific Survey
- Analyzing your Data and Drawing Conclusions
- Mission Folder Submission Tips and Guidelines

Interactive Webinars

Webinars, hosted by eCYBERMISSION CyberGuides, were effective in guiding students and Team Advisors through the submission steps of their Mission Folders and provided students with the opportunity to interact virtually with STEM professionals. These webinars directly corresponded with the Mission Folder tips and worksheets. Even if participants were not able to attend the live webinar, all recordings were archived on the eCYBERMISSION web site to build a resource repository for students and Team Advisors.

Key messages and Webinar topics

- Building Your Team's Project Plan
- Jumpstart your Research
- The Engineering Design Process
- Constructing a Hypothesis
- Conducting an Experiment and Testing your Hypothesis
- Conducting a Survey
- Data Analysis and Drawing Conclusions
- Mission Folder Submission Tips with Q&A

CyberGuides

CyberGuides are professionals working in STEM fields who volunteer their time to assist students as they complete their Mission Folders, answering questions about their projects and helping them to overcome potential issues with their experiments. CyberGuides provide a unique experience for students to interact with STEM professionals and gain feedback and advice about their eCYBERMISSION projects. This is an important resource, particularly for students who do not have access to subject matter experts because of location, expenses and other deterring factors. CyberGuides also provide mentorship and guidance to assist teams in the submission of their Mission Folders through the use of discussion forums, instant messaging, private chat rooms and interactive webinars.

CyberGuide biographies were available on the eCYBERMISSION web site, allowing teams to search for a CyberGuide that would best fit with their specific project topic. This also helped to familiarize students with CyberGuides and increase the likelihood that students would utilize them as a resource to ensure Mission Folder submission. Additionally, personal CyberGuide interviews were featured on the eCYBERMISSION blog to provide an in-depth look at the program's Volunteers and encourage students to reach out with questions or concerns regarding their projects.

Social Media Outreach

Social media enables eCYBERMISSION to communicate and develop relationships with key stakeholders in a highly interactive environment. The eCYBERMISSION team utilized numerous social media tactics during the 2011-2012 competition year, resulting in steady increases in usage and participation. Through the eCYBERMISSION Facebook page, blog, and Twitter feed the eCYBERMISSION team was able to stay connected to current and potential Team Advisors, students, and other stakeholders, providing important information such as deadlines, registration requirements, webinar schedules, and information about the U.S. Army and overall STEM landscape. SchoolTube was also utilized to broadcast program webinars and videos so they could be shown in schools at which YouTube is restricted. Social media also provided an opportunity to optimize outreach trips and presentations at conferences and other events across the country, enhancing the program's reach while on the road. Increased social media efforts led to a steady growth in followers and visitors and resulted in a broader impact of all integrated tactics.



Judging

The 2011-2012 competition marked the second year that the judging period was broken into two phases. During the first phase, Virtual Judges evaluated and scored all submitted Mission Folders to determine the state winners. During the second phase, the regional judging panel evaluated and scored the top four teams in each region and grade to determine the 16 regional finalist teams that would go on to compete at the national level. The volunteer program also offered extensive training for Virtual Judges to familiarize them with navigation on the web site and the overall judging process.

Training

To ensure Virtual Judges were informed and prepared, a multi-pronged training approach was implemented during the 2011-2012 competition year. An instructional email was sent to registered Volunteers with step-by-step instructions on how to log in to the eCYBERMISSION web site and navigate the judging module. We also included an invitation to attend any of the five Virtual Judge training webinars.

The volunteer program coordinators conducted the Virtual Judge training webinars before the start of the virtual judging period (February 27 – March 23, 2012). The training webinars provided new and returning Virtual Judges with basic background information on the program, competition rules and updates, web site features, and new judging criteria. The interactive session allowed participants to watch the eCYBERMISSION volunteer program host and navigate the eCYBERMISSION website and use the judging module. The environment also allowed participants to ask questions directly to the volunteer program host, and receive live feedback and guidance. Upon the completion of the webinar session, a recording was archived on the eCYBERMISSION website for reference throughout the judging period.

Virtual Judging Period

It is vital for the Volunteer Program to recruit a sufficient number of Virtual Judges to score the thousands of Mission Folders that are submitted by students. This year, 2,289 Mission Folders were submitted and scored. Because of the high number of Virtual Judges this year, each judge was assigned 10 or 11 Mission Folders for the 2011-2012 competition year, as opposed to the 20-25 assigned in past years. The smaller number of assigned Mission Folders allows Virtual Judges to spend more time scoring each folder and providing constructive feedback to teams.

Virtual Judges have the option to provide feedback to students through comments on the Mission Folders, which are carefully reviewed by staff before they are sent to the Team Advisors. This year 91 percent of teams received direct feedback from judges. This is a unique aspect of eCYBERMISSION, as students will receive valuable feedback, helping them to grow and improve in their STEM education.

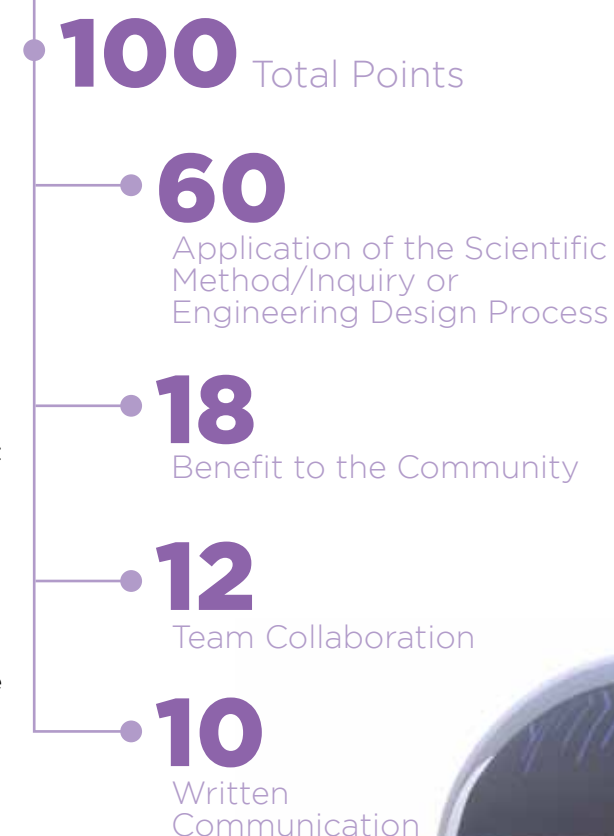
For the second year, the United States Military Academy offered its students extra credit for participating in eCYBERMISSION as a Virtual Judge. Thanks to this incentive, 698 West Point cadets registered as Virtual Judges and were required to score five Mission Folders to receive the extra credit. This is a 42 percent increase over last year. Additionally, 30 Maryville University (St. Louis) students participated as Virtual Judges for eCYBERMISSION as a mandatory grade requirement. Each Maryville student scored five Mission Folders for eCYBERMISSION. As eCYBERMISSION continues to grow, it is important to develop and grow relationships with colleges and universities that share the same principles and goals in developing STEM education in our nation. The support they provide helps to strengthen the development of young scientist and engineers, as well as the volunteer pool supporting the eCYBERMISSION Program.

Regional Judging

There were significant changes to the regional judging process for the 2011-2012 competition. This year, 17 Regional Judges were nominated by and selected from Army organizations across the country, including Army Materiel Systems Analysis Activity (AMSAA); Tank Automotive Research, Development and Engineering Command (TARDEC); Aviation and Missile Research, Development and Engineering Center (AMRDEC); Edgewood Chemical Biological Center (ECBC); Armament Research, Development and Engineering Center (ARDEC); Communications-Electronics Research, Development and Engineering Center (CERDEC); and Natick Soldier Research, Development and Engineering Center (NSRDEC).

The 64 regional finalist teams were required to submit an abstract of their Mission Folders to the Regional Judges and then participated in a teleconference to present their projects to the regional judging panel. The new regional judging process provided an extra layer of credibility by challenging the students' knowledge and expertise on their project, which creates a stronger pool of national finalists. The new process also allows for a distinction between the state and regional levels of the competition.

After each team completed its presentation, the Regional Judges had 10 minutes to finalize their scores and provide comments. Regional Judges were provided a scorecard with a cumulative total of 100 points to score the teams. The regional judging criteria were composed of the Application of the Scientific Method/Inquiry or Engineering Design Process (60 points), Benefit to the Community (18 points), Team Collaboration (12 points), and Written Communication (10 points). The regional judging scores were then averaged with the teams' Mission Folder scores. The teams with the highest average scores from each grade and region were selected as regional winners. Those 16 regional finalist teams then competed nationally at the 2012 NJ&EE.



Volunteer Awards



In honor of the 10th anniversary year, the eCYBERMISSION team presented awards to those Volunteers who provided exceptional support and went above and beyond the call of duty. eCYBERMISSION Volunteers play an important role in the competition and are vital contributors to the growth of young students and the success of eCYBERMISSION. The following Volunteers were recognized for their hard work and dedication to promoting eCYBERMISSION, mentoring student teams and judging Mission Folders:

Volunteer of the Year

Jeffrey Gillispie: Jeffrey has been serving in the National Guard for longer than four years as an ammunitions specialist and is a first-year Ambassador and CyberGuide. As an Ambassador, he conducted outreach to four schools and registered 39 students from Young Junior High School in Texas. He also hosted a CyberGuide webinar and actively participated in discussion forums. Jeffrey attends Tarrant County College in Fort Worth, Texas, and is a lifeguard at his local YMCA.

Team Advisor of the Year

Suzette McIlwaine: Suzette is a teacher from Stone Hill Middle School in Ashburn, Virginia. This year, she had 183 students register for eCYBERMISSION, and 91 percent of them submitted Mission Folders. This is her second year participating in eCYBERMISSION and her first year with a winning team. She was the Team Advisor for the GRAND Giraffes, the seventh-grade first-place state winning team in Virginia and a Regional Finalist Team.

Andi Suter: Andi is an eighth-grade science teacher from Serrano Intermediate School in Lake Forest, California. In her first year with eCYBERMISSION, Andi registered 201 students and had 100 percent of them submit their Mission Folders. This year, she had the eighth-grade second-place state winning team in California. Andi also served as a National Judge in this year's competition.

Ambassador of the Year

Ernesto Mondragon: As an Ambassador this competition year, Ernesto conducted outreach to teachers, counselors and principals at schools in the Green County Region in northeast Oklahoma. Through his efforts, he was successful in getting the Sixth Grade Center in Sand Springs, Oklahoma to register for eCYBERMISSION, which consisted of seven teams and 27 students in total. Ernesto also attempted new ways to recruit participants for the program and gave a presentation about eCYBERMISSION to the Mayor's Police and Community Coalition for the City of Tulsa and the Safe Communities of Northeast Oklahoma. His efforts are reflective of his dedication and support as an Ambassador.

CyberGuide of the Year

Lauren McNew: As a CyberGuide, Lauren hosted more webinars and private chat sessions with student teams than any other CyberGuide, at five each. Lauren also participated in Army Labs Day at NJ&EE last year, providing hands-on STEM activities for students, and has remained actively involved with the program ever since. She recruited her husband to participate as a Virtual Judge and wrote a CyberGuide guest blog for the eCYBERMISSION blog.

Virtual Judge of the Year

Linda Cline: During the virtual judging period this year, Linda completed 51 Mission Folder assignments and provided encouraging comments to student teams regarding their Mission Folders. Linda also participated as a Regional Judge during eCYBERMISSION's regional judging period for the seventh grade. Linda has volunteered for eCYBERMISSION for the past nine years and has been a strong supporter of the program.

National Judging and Educational Event

The 10th annual NJ&EE took place at the National Conference Center in Leesburg, Virginia June 18-22, 2012. Sixteen teams from across the country traveled to NJ&EE to compete for the national title in their grade and to enjoy a week filled with hands-on activities and field trips. The 2012 NJ&EE was filled with activities designed to promote STEM, teamwork and creativity. It also gave students a chance to witness firsthand some of the U.S. Army's most advanced technologies.

Highlighted events of the week

The STEM Tech Expo, where scientists and engineers from eight U.S. Army RDECs conducted interactive sessions with students that were designed to teach the applications of STEM and demonstrate the range of high-tech work within the U.S. Army. Activities included DNA extraction, cryogenic freezing and a lunch of Meals Ready to Eat (more commonly known as MREs).

A special guest appearance by Michael and Geoffrey Howe of Discovery Channel's popular "Howe and Howe Technologies" program, who specialize in innovative thinking and creativity to develop high-tech projects.





Students toured the Natural History Museum, the National Monument and the World War II Memorial on the National Mall in Washington, and then visited the Steven F. Udvar-Hazy Center in Chantilly, Virginia, where they saw the newly installed Discovery space shuttle.



Dr. Kiki Sanford interviewed four teams for the live broadcast of her show, "Dr. Kiki's Science Hour."



The National Showcase (<http://www.ustream.tv/channel/ecybermission-national-showcase>) provided an opportunity for the finalist teams to present their projects to family, friends and distinguished guests. The event was emceed by Todd Morris, Deputy Chief of Staff, U.S. Army RDECOM; and Erica Bertoli, Outreach Program Manager for CERDEC.



During the 2012 National Awards Luncheon, all 16 national finalist teams were recognized for their efforts in STEM, and received certificates and medals in honor of their achievements in eCYBERMISSION. Finally, the four national winning teams in each grade were announced, and each student was given an additional medal and a certificate awarding each with an additional \$5,000 in U.S. savings bonds.



The Awards Luncheon was attended by several distinguished guests:

- » Dr. Arun A. Seraphin, Principal Assistant Director for National Security and International Affairs at the White House Office of Science and Technology Policy
- » Jeffrey D. Singleton, Director for Basic Research; Director for Laboratory Management and Educational Outreach Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA ALT)
- » Dale A. Ormond, Director, U.S. Army Research, Development and Engineering Command (RDECOM)
- » Maj. Gen. Nick Justice, Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA ALT)
- » Command Sgt. Maj. Lebert O. Beharie, U.S. Army RDECOM
- » Todd Morris, Deputy Chief of Staff, U.S. Army RDECOM
- » Ernesto Mondragon, Ambassador of the Year
- » Lauren McNew, CyberGuide of the Year
- » Linda Cline, Virtual Judge of the Year
- » Jeffrey Gillespie, Volunteer of the Year
- » Andi Suter, Team Advisor of the Year

Army Values Award

The 2012 NJ&EE marked the second year the Army Values Award was presented, in which the noncommissioned officers reward a team that has exemplified the Army core values (loyalty, duty, respect, selfless service, honor, integrity, personal courage) throughout the week. This year's recipient was Team Charger 9, a ninth-grade team from Charlotte, N.C. Team Advisor Barbara Morrow and students Alexander Heintze, Matthew Howard and Christian Ortiz earned this recognition for demonstrating these values in their interactions with fellow eCYBERMISSION students, Team Advisors and staff throughout the week's activities.

From left: Jeffrey D. Singleton, Alexander Heintze, Matthew Howard, Maj. Gen. Nick Justice, Christian Ortiz, Dale A. Ormond, Team Advisor Barbara Morrow, Staff Sgt. Tracy Campbell, Command Sgt. Maj. Lebert O. Beharie



National Finalist Teams

SIXTH GRADE

"Scientific Seahorses"

Selah Intermediate School; Selah, Wash.

The "Scientific Seahorses" set out to develop a new type of insulation that would resist heat flow better than other kinds of insulation. This new type of insulation could benefit both the team's community and the environment by lowering heating and cooling bills and decreasing electricity use. The team developed "Vacuum Insulation" to simulate a wall, the team used silicone grease, creating an air tight seal between a wood frame and acrylic sheeting. Next, they attached a layer of foil to one side to stop radiation. Last, they heated one side with a heater and tested the temperature on the inside and outside while the vacuum kept the air inside the wall. The students concluded that the "Vacuum Insulation" was a success with an R value of about 4.75, which has the best resistance to heat flow (compared to 3.1-4.3 for other insulations).

"Sun Sensors"

George J. Mitchell Elementary School; Little Egg Harbor, N.J.

Team "Sun Sensors" investigated claims made by sunglass manufacturers that sunglasses block high energy blue and UV wavelengths of light, therefore preventing damage to our eyes. The team designed and conducted three experiments that tested the effect of sunglasses on the spectrum of visible light, determined if UV waves pass through lenses, and quantified its results using a UV light source, Vernier UVA and UVB sensors, and Logger Pro software. Based on the analysis of the data they collected, the students discovered that the lens samples affected the brightness, color bands and width of the visible light spectrum while blocking the harmful UV wavelengths of light. As members of its community spend a great deal of time outside, the team recommends that everyone wear sunglasses to protect their eyes and prevent damage.

"TApossibility"

Jenks East Intermediate School; Jenks, Okla.

The "TApossibility" team explored the benefits of using technologically advanced energy and water efficiency devices in its school. First, the team investigated a model LEED (Leadership in Energy and Environmental Design)-certified high school building to develop recommendations for its school. Based on the information gathered, the students looked at the cost savings from using energy efficient light bulbs and water conserving toilets in the school. Through mathematical analysis, the team realized that these two changes would lead to significant cost savings to the school and also leave a much smaller footprint on the environment. The team also designed and administered a survey for students and teachers to test their awareness of the changes. They concluded that students should be educated about energy conservation in their school. The students can then apply this knowledge to their personal lives and communities.

"CommandZ"

White Station Middle School; Memphis, Tenn.

Team "CommandZ" created a behavior modification system to solve the issue of people relying on technology to connect with others. Using an online form based point system to track users' participation in various categories, the team generated leaderboards that compared users to others and took advantage of competitive traits in participants to force players to keep interacting to get the high score. To test the system, the students created a small-scale prototype that measured participation of a group of students as they attended school and out of school events. To measure increases in participation, they designed and conducted surveys before and after testing. After running tests for three weeks they analyzed the data and discovered that not only did participants consistently use their system, but participation increased dramatically in all categories after using it.

SEVENTH GRADE

“Truth2O”

Fern Ridge Middle School; Veneta, Ore.

“Truth2O” aimed to raise awareness of the health, environmental and financial impacts of plastic water bottles. First, the team tested the widely known urban legend that leaving a plastic water bottle in the sun will cause harmful petrochemicals to leach into the water. The students then researched the point of origin for 14 brands of water and determined that the total shipping miles for all bottles sold in their local market were more than 40 million. Next, the team compared the price of its town’s water, 0.3 cents per gallon, to the average price of the water bottles sold at the local market at \$8 a gallon. Finally, they presented their findings to a study group and conducted before and after surveys. The team hopes that such educational outreach would reduce the use, as well as the health, environmental and financial impacts of plastic water bottles.

“SAVETHEPLANET”

Patapsco Middle School; Ellicott City, Md.

Team “SAVETHEPLANET” conducted a survey that showed 78 percent of people spend over an hour at a time on the computer, an unhealthy amount of time without breaks. To help solve this problem, the students learned basic electronics and soldering techniques to design and build a prototype that would alert the user to take regular breaks from the computer. The prototype design consists of three main components: two force sensors, an FET switch and a timer. When more than 20 pounds are placed on the sensors, the switch turns on and activates the timer. If used as intended, the cushion beeps and alerts the person sitting on it to take a break every hour, alleviating eye strain and backaches.

“Dust Bunnies”

Science Rocks U; Whiteface, Texas

The “Dust Bunnies” collected airborne topsoil over 775 square miles, measuring 500 particles per square centimeter, confirming a critical community issue - soil erosion. The team hypothesized that better farming methods and advanced technology in agronomy would protect topsoil. A combination of materials, science and plowing techniques were applied to 4,000 acres of cotton fields. The team used GPS systems, iPad apps and tractors engineered for better tillage. Superabsorbent polymers and nanoclays were added to soil in various ratios, and plowed traditionally and in minimum tillage. The loss of topsoil was measured by massing soil samples before and after months of experimentation. The most effective method of conservation was attained by placing polymers throughout minimum tillage fields, decreasing soil loss by 35 percent. As a result of virtual teamwork from two areas of the state, 2,000 acres were protected with the potential of conserving half a million acres of topsoil in the future.

“Iris”

Stone Middle School; Melbourne, Fla.

Team “Iris” conducted a study to help solve the problem of coral bleaching, a condition in which corals lose their endosymbiotic zooxanthellae, which makes the coral become white. This condition is caused by several factors, including UV radiation. Following its study, the team found that the data supported its hypothesis. Bleached anemones that were injected with harvested zooxanthellae recovered more quickly than bleached anemones that were not injected, as indicated by a higher mean number of zooxanthellae in the test group. The students’ community would benefit from a method of helping coral reefs recover from bleaching events. Coral reefs are an important part of the ocean ecosystem in Florida and form the basis of a major tourism industry. The team believes that if this technique of reintroducing zooxanthellae could be refined, coral would recover more quickly resulting in healthier reefs.

EIGHTH GRADE

“Kenya Grow It?”

Memorial Park Middle School; Fort Wayne, Ind.

Team “Kenya Grow It?” decided to experiment with biostimulants and amaranth, a very nutritious plant that is currently being grown in Africa, to help address hunger and nutrition concerns in Kenya. The students planted both vegetable and grain types of amaranth and treated each seven different ways. To measure the results, the team did height and weight tests, a soil microbe count and a sugar content test. The results proved that the amaranth grew most effectively with a combination of biostimulants and cow manure. To share the results, the team is meeting with their direct contact from Kenya to discuss expanding the experiment there, and a representative from Africa University to talk about starting an amaranth/biostimulants project at the university. They are also continuing their project by growing amaranth with biostimulants with Burmese refugees in local community gardens.

“Project Radiance”

Rocky Run Middle School; Chantilly, Va.

The “Project Radiance” team set out to identify an alternative to traditional heating and cooling methods that require fossil fuels, a nonrenewable energy source that causes air pollution and contributes to global warming. The team discovered geothermal heating and cooling, a remarkably cost efficient and eco-friendly process, and visited a geothermal heating facility to interview a professional to gain more insight into its real world applications. The students built a model of a geothermal system simulating summer and winter in their home state of Virginia using engineering skills and a variety of materials; including an aquarium, soil, plastic tubing for liquid circulation, a water pump, a thermometer and other tools. Using math for data analysis, their results proved that in both seasons, geothermal heating is effective. In addition to a Facebook page and a blog, the team created a set of surveys with an informative PowerPoint to educate its community and assess their knowledge of geothermal heating.

“Innovation in Autism”

Mirman School for Gifted Children; Los Angeles

The mission of “Innovation in Autism” was to develop a device that would autonomously sense stereotypy, one of the most common behavioral issues in children with Autism Spectrum Disorder, and respond with vibration, cueing the child to stop engaging in this behavior. The students used the Lilypad™, a set of electronics, to build their device and deduced the parameters that would be required to program it. Following approval from The Help Group’s Institutional Review Board, they tested the device on children with autism. At this stage of prototype development, the team has created a device that records human motion and proves that the duration and frequency of autistic children’s stereotypy greatly decreases with vibration therapy. In the future, the team plans to record data from more test subjects to increase its sample size and thus, the validity of its study.

“RADIANS”

Shanghai American School; Shanghai, Pudong, China

The “RADIANS” worked on a project called “Shanghai’s Dilemma” that compared produce from local markets and international supermarkets for nutritional content and exposure to heavy metals, pesticides, and bacterial contamination. The team found that while there are no nutritional differences in the produce from the two sources, the produce from the local market is less contaminated, contrary to the team’s hypothesis. The team hopes that these results will encourage the community to shop at the local market. Shopping at the local market will boost the local economy and has the added benefit of being less expensive for the consumer.

NINTH GRADE

“Magma Milita”

Elmira High School; Veneta, Ore.

“Magma Milita” designed a system to harness geothermal energy, which could provide a reliable source of green power and reduce dependence on fossil fuels, as well as CO2 emissions. The team built and tested reiterative models of the Heat Reaper—a closed, dynamic fluid system in which a liquid medium flows through underground piping to actively extract heat from hot dry rock and transfers it to an exchanger above grade level. The team’s final design involved two coils engineered to maximize dwell time, a fuel pump to circulate the liquid and a series of valves to compartmentalize the design. The students tested four mediums (water, ethylene glycol, polyalphaolefin, and a water/ethylene glycol blend) to determine which transferred the most heat. They found water to be most effective. The team envisions the Heat Reaper being able to power a home, village, or city and possibly on a global scale.

“Eco Scienceteers”

Pinelands Regional Junior High School; Tuckerton, N.J.

The “Eco Scienceteers” investigated viable alternatives for cooking where wood is replaced by biomass waste products; such as peanut shells, pine needles, banana peels, sugarcane waste and corn stalks. The project included methods of preparing both peanut shell and pine needle materials for briquetting and the design of low cost, easy to ship mini-presses. The students developed more than one design and all of the presses were shown capable of exerting enough force and pressure to produce effective biomass briquettes. The mini-compound double lever press was the most effective press and was used in making the briquettes. Using biomass briquettes will reduce the amount of trees that are cut down in order to provide wood as cooking fuel, reduce the amount of money families and orphanages have to expend on cooking fuel, and serve to promote conservation where deforestation is a major problem.

“Wound Warriors”

Science Rocks U; Whiteface, Texas

The “Wound Warriors” focused on developing a bandage that would decrease the risk of bacterial infection for soldiers injured in the field and those with high risk conditions. The team applied many different natural and prescription ointments on wounded planaria invertebrates to learn which ingredient would fight bacteria and allow for quick regeneration of tissue. Numerous substances were also tested in Petri dishes including honey, Vitamin B, green tea and Omnicef. In multiple tests, honey was as effective as prescription strength antibiotics and repeatedly slowed down the rate of the bacterial growth fastest in wounds. Honey was then applied to a biomaterial called hydrogel in a tissue engineering experiment. The material was formed into a pattern mimicking the overlapping skin cells of sharks – which do not contract infections. The use of this bandage decreased bacterial growth in the lab by 25 percent.

“Team Charger 9”

Providence Day School; Charlotte, N.C.

The “Team Charger 9” team attempted to make fresh produce last longer in a standard household refrigerator. To do this, the team engineered a device that dehumidifies and filters the air inside of a refrigerator. The students modified an Eva Dry Petite 1100 dehumidifier and added a 3M Filtrete Filter to reduce spores or particles in the air and installed it into a donated refrigerator. The collected condensate was recycled into the freezer where it could be used as ice. The team named its device the FFL (which stands for Fresh Food Longer), and used fresh, non-organically grown strawberries as its test subject. After multiple test runs, the team concluded that the spoil rate is directly affected by humidity levels and amount of reproductive spores inside the refrigerator.

National Finalist Teams

National Winning Teams

SIXTH GRADE

“Sun Sensors” from George J. Mitchell Elementary School; Little Egg Harbor, N.J. Team Advisor Patricia Naples with students Dylan Breese, Jayden Craft, Brianna Hoegler and Jessie Rising

From left: Mr. Jeffrey D. Singleton, Team Advisor Patricia Naples, Brianna Hoegler, Maj. Gen. Nick G. Justice, Jessie Rising, Mr. Dale A. Ormond, Jayden Craft, Command Sgt. Maj. Lebert O. Beharie, Dylan Breese



SEVENTH GRADE

“Dust Bunnies” from Science Rocks U; Whiteface, Texas. Team Advisor Laura Wilbanks with students Alison DeBusk, Robin Hicks and Haley Roberts

From left: Mr. Jeffrey D. Singleton, Team Advisor Laura Wilbanks, Maj. Gen. Nick G. Justice, Alison DeBusk, Robin Hicks, Mr. Dale A. Ormond, Haley Roberts, Command Sgt. Maj. Lebert O. Beharie



EIGHTH GRADE

“Innovation in Autism” from Mirman School For Gifted Children; Los Angeles. Team Advisor Arnold Lesin with students Jonathan Berman, Maya Flannery, Arjun Mahajan

From left: Mr. Jeffrey D. Singleton, Team Chaperone Arpa Ghazarian, Maya Flannery, Maj. Gen. Nick G. Justice, Arjun Mahajan, Mr. Dale A. Ormond, Jonathan Berman, Command Sgt. Maj. Lebert O. Beharie



NINTH GRADE

“Wound Warriors” from Science Rocks U; Whiteface, Texas. Team Advisor Laura Wilbanks with students Jessica Lawson, Marcus Ruff, Madison Wilbanks

From left: Mr. Jeffrey D. Singleton, Team Advisor Laura Wilbanks, Maj. Gen. Nick G. Justice, Jessica Lawson, Madison Wilbanks, Mr. Dale A. Ormond, Marcus Ruff, Command Sgt. Maj. Lebert O. Beharie



Looking Forward

As we look toward the 2012-2013 competition year, we expect another exciting year as we strive to dramatically increase student interest in STEM. By building on the successes of the 10th anniversary program year, we will continue to expand the reach of the program and increase program impact. Since the program's inception in 2002, nearly 100,000 students have participated worldwide. In addition, the U.S. Army has awarded almost \$9 million in savings bonds to students to contribute to their college funds and continue in their STEM education. This real-life application competition is crucial to sparking a continued interest in STEM beyond the classroom and in challenging students to advance their STEM education and fully realize the opportunities available to them. The eCYBERMISSION program will continue to expand the diversity of its reach and impact, making STEM accessible to students of all backgrounds and economic means.

One way eCYBERMISSION is striving to expand is by complementing and enhancing day-to-day classroom education, ensuring the program is structured to fit into classroom curriculum by aligning with Next Generation Science Standards (NGSS) and many Common Core Standards for math, writing, and reading literacy in science and technology.

Curriculum Integration Plan

The Curriculum Integration Plan (CIP) is a strategic, long-term initiative to evolve and position eCYBERMISSION as a resource for educators within the classroom and as a leader in the STEM competition landscape. The ultimate goal of the eCYBERMISSION program is to engage our students in STEM early on in their education to increase our national STEM literacy and ensure a sustained quality STEM talent pool essential to delivering innovative technological solutions for the nation. Through the creation of a robust curriculum resource guide, teachers will have the ability to implement the program into their current curriculum, thus creating a population of "eCYBERMISSION schools."

In addition, providing educators with an eCYBERMISSION Curriculum Guide, specifically tailored to the national standards, will improve the quality of submissions by providing a resource guide that helps align eCYBERMISSION to national Common Core Standards. Using the resource guide as the gateway to classroom integration and school-wide success with eCYBERMISSION, the program will be able to measure its impact before and after the school has integrated by means of test scores and other aggregate data.

The intensive process for the CIP relies heavily on the creation of the resource guide and input from key stakeholders. Through the use of a crowdsourcing tool, eCYBERMISSION first engaged virtually with both internal and external stakeholders to secure constructive feedback regarding the program and lend long-term assistance and guidance for the resource guide development and overall classroom integrating. eCYBERMISSION then identified a select group of diverse and dedicated Team Advisors. Through an intensive selection process, more than 80 applicants were reviewed for consideration and 10 were selected to participate in the 2012-2013 Team Advisor roundtable responsible for providing feedback on eCYBERMISSION and developing the resource guide for the 2012-2013 competition.

Outreach

The eCYBERMISSION team will build on successful outreach tactics and will continue to focus efforts on Team Advisor retention, Volunteer outreach and targeted campaigns to states with historically low participation that have a large population of potential students. Our strategic outreach plan is geared to reach more students, teachers, administrators and Volunteers than any other year. This outreach will generate more awareness of and interest in eCYBERMISSION. It will also serve to provide the opportunity to gain insight from educators throughout the country on ways to continue to grow and improve the program.

We are excited to continue our contribution to the ever-changing STEM environment and to bring an even better STEM experience to students across the country. We look forward to engaging more students than ever before and honoring their hard work and dedication in the 2012-2013 program year!





Ecybermiss10thn

ACCEPT THE CHALLENGE
DECADE OF STEM INNOVATION AND INSPIRATION

