

2010 Annual Performance Report
NASA SCIENCE, ENGINEERING, MATHEMATICS AND AEROSPACE
ACADEMY (SEMAA)

Administered by: Paragon TEC, Inc.
Type of Agreement: Contract

Project Manager: Darlene S. Walker
John H. Glenn Research Center
(216) 433-8664

PROJECT DESCRIPTION

The NASA Science, Engineering, Mathematics and Aerospace Academy (SEMAA) is a national education project designed to increase the participation and retention of historically underserved and underrepresented K-12 youth in the areas of science, technology, engineering, and mathematics (STEM).

SEMAA delivers three core components: a set of hands-on, minds-on K-12 STEM curriculum enhancement activities, a state-of-the-art Aerospace Education Laboratory (AEL), and an innovative Family Café.

The NASA SEMAA project currently operates at 14 sites located throughout 12 states and the District of Columbia. Site locations include community colleges, four-year colleges/universities, Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), primary/secondary schools, science centers and museums.

PROJECT GOALS

The goals of SEMAA are to Inspire a more diverse student population to pursue careers in stem related fields; Engage students, parents and teachers by incorporating emerging technologies; and to Educate students by utilizing rigorous STEM curriculum enhancement activities that meet national math, science and technology standards and encompass the research and technology of NASA's four Mission Directorates.

PROJECT BENEFITS TO OUTCOME 2

Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.

SEMAA is the only K-12 STEM project in the NASA Elementary and Secondary Program education portfolio providing a seamless NASA pipeline for elementary and secondary age students, families and teachers.

In FY 2010, the SEMAA Project contributed to Outcome II with the following accomplishments:

- 60,604 Students, Parents/Adult Caregivers, Teachers and Outreach participants were served in FY 2010
 - 45,393 Total Students (19,343 Direct Students and 25,959 Indirect Students)
 - 213 with Special Needs and 49% of Direct Students were Female

- NASA STEM Pipeline Collaborative Activities
 - Fostered the participation of NASA SEMAA students in 60+ other STEM programs/projects, thus maximizing student exposure and interest in STEM and strengthening the national K-12 STEM pipeline
 - Participation included Summer of Innovation, Moon Buggy Competition, Team America Rocketry Challenge, Educator Astronaut Program, EarthKAM Mission, Engineering Design Challenges, First LEGO League, Reduced Gravity Flight Opportunity, Minority STEM Forum, Astrobiology in Secondary Classrooms, AESP Workshops, NES, and the INSPIRE project

PROJECT ACCOMPLISHMENTS

APG 10ED06: Achieve 50% or greater level of interest in science, technology, engineering and math (STEM) careers among elementary and secondary students participating in NASA education programs.

- In FY2010, SEMAA significantly contributed to this APG by achieving an 87.4% level of interest in STEM careers among SEMAA students (5,922 out of 6,774 respondents) who participated in the NASA SEMAA project.

APG 10ED08: Increase to 470,000 the number of elementary and secondary student participants in NASA instruction and enrichment activities (a 5% annual increase above the FY 2007 baseline of 408,774).

- In FY2010, SEMAA contributed to this APG by increasing the number of elementary and secondary direct student participants in NASA instruction and enrichment activities to 19,434. This constitutes a 9% increase over the total number of direct students served in FY2007, when the project served 17,773 student participants.

Additionally, the project served 25,959 indirect students in FY2010 for a total 45,393 (direct + indirect) elementary and secondary student participants served in NASA instruction and enrichment activities.

In FY 2010, SEMAA accomplished the following:

- York College CUNY SEMAA served its 10,000th student participant. Celebration was held March 27, 2010.
- Strategic Partnerships were formed to expand SEMAA's reach.
 - Martin University (Indianapolis, IN) established a new SEMAA site via Space Act Agreement.
 - Awarded \$1.3M in Non-NASA grant funding for SEMAA sustainability
 - Lorain City Schools (OH)
 - Pilot use of the SEMAA Curriculum Enhancement Activities (CEAs) in a Pre-Engineering Elementary School (Frank Jacinto Elementary)
 - Installed an Aerospace Education Lab (AEL) at Longfellow Middle School
 - Leveraged \$250K in Non-NASA funding for the AEL
- New SEMAA Site solicitation was issued. Two new sites were selected. The sites are located at University of Texas EL Paso, and Hartnell Community College, Salinas, California. The new sites will serve predominantly Hispanic communities, increasing the project's ability to reach the target population.
- SEMAA teachers from the Miami-Dade SEMAA site participated in professional development programs at Ames Research Center (ARC) and Langley Research Center (LaRC). At each Center the teachers were task to develop a hands-on activity that could later be shared with students as well as colleagues. The teachers worked side by side with engineers. The teachers were given an opportunity to experience the latest technology developed by NASA. Focus was placed on aeronautics modeling and simulation.
- SEMAA teachers from the Fernbank Science Center participated in the Reduced Gravity Flight Opportunity offered by Johnson Space Center. Experiments created by SEMAA students were flown under Zero-G conditions aboard a NASA research aircraft. The SEMAA teachers will incorporate this experience and activities from NASA's Microgravity Educator Guide into their lesson plans for the upcoming school year.
- Wayne State University SEMAA site received a \$300,000.00 grant from the United States Department of Education to use for sustainability of the NASA SEMAA Project and upgrades to the AEL.

Return on Investment:

Based on the quarterly performance reports and data collected from the funded NASA SEMAA project sites, the following examples highlight SEMAA's Return on Investment in FY 2010.

- College President of former SEMAA site at Livingstone College, moves to Martin University in Indianapolis, Indiana and raises more than \$800,000.00 to privately fund Indiana's first NASA SEMAA site and state of the art AEL.
- Sheereen Brown was enrolled at the Fernbank Science Center NASA SEMAA site for 8 years. She currently attends Georgia Institute of Technology in Atlanta, Georgia with a major in Industrial and Engineering Systems. She is a member of Lambda Delta Rho: Georgia Tech Society of Black Engineers and has served in the capacity of President of the organization. Additionally, she served as a production control intern at Lockheed Martin.
- Stetmond Roberson, a former NASA SEMAA student from Cuyahoga Community College graduated from the University of Rochester with a degree in mechanical engineering and is currently works for Zin Industries in Cleveland, Ohio.

PROJECT CONTRIBUTIONS TO PART MEASURES

PART MEASURE – Student Involvement: Number of elementary and secondary student participants in NASA instructional and enrichment activities.

In FY 2009 SEMAA served 40,471 K-12 student participants. In FY 2010 the project served 45,393 students resulting in a 12% increase compared to FY 2009

PART MEASURE – Student STEM Career Interest: Percentage of students expressing interest in science, technology, engineering, and math (STEM) careers following their involvement in NASA elementary and secondary education programs.

In FY 2010, 87% of respondents (5,922 out of 6,774) expressed an interest in STEM careers, representing a 6% increase over the FY 2009 result of 81% and a 37% increase over the FY 2007 baseline of 50%

PART MEASURE - Cost per participant for NASA elementary and secondary education programs:

In FY 2010, the SEMAA Project served 414 educators and 45,393 students for a total of 45,807 participants (students and teachers) served. The project operated at a total cost of \$67.41 per participant in FY09 (Annual Budget = \$3,088,000 / 45,807 Total Participants). The project also served 6,735 SEMAA parents/caregivers during the FY09 Family Cafe component and 5,880 outreach participants.

IMPROVEMENTS MADE IN THE PAST YEAR

Significant SEMAA improvements during FY 2010 included:

- AEL Advanced Flight simulator was upgraded to utilize a 65 inch commercial grade plasma screen television with yolk and rudder pedals.
- All AELs now come standard with a reduced gravity drop tower and Mars robotic lab
- SEMAA Website and On-line Application Development
 - On-line application requirements finalized in compliance with NASA IT Guidelines
 - Developed Draft ITPA/PIA (Privacy Impact Assessments) and made recommendations on Systems of Record Notice (SORN) and System Hosting/Ownership responsibilities for a Shared Environment

PROJECT PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

SEMAA sites are required to develop partnerships annually that will both enhance and sustain STEM project services beyond NASA funding. During fiscal year 2010, SEMAA leveraged over \$4.3 Million dollars in funds (including both financial and in-kind support) for K-12 STEM education, constituting more than a 140% match to the total project budget provided by NASA. SEMAA has leveraged over \$22.3 Million dollars in funding for K-12 STEM education from 2004 – 2010.

Roles and Responsibilities of SEMAA stakeholders and partners

Organization	Responsibility
NASA HQ	Provides funding for the SEMAA Project.
NASA Glenn Educational Programs Office	Serves as the SEMAA Project Manager providing guidance and overall project management.
NASA Center Education Offices	Provide services to the SEMAA sites in their region.
NSO Contractor Paragon TEC, Inc.	Manages the National SEMAA Office (NSO); oversees the day-to-day operations of the SEMAA sites. Works with NASA to establish new SEMAA sites as well as installation of AELs.
NASA Glenn – On Site Contractor SGT, Inc./Paragon TEC, Inc.	Support Service Contractors who support the project management efforts of the SEMAA project.
SEMAA Sites	Deliver the SEMAA project to students, families, and teachers. Key personnel at the SEMAA Sites include the Site Director and the AEL Coordinator.
Partners/Stakeholders	Provide financial and/or in-kind contributions to enhance and sustain SEMAA beyond NASA funding.