



AEROKATS and ROVER Education Network (AREN)



Wayne RESA, Wayne MI - 2018 Annual Report

Programmatics

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Total Value: 5 Year - \$2,498,590; 2017 - \$638,645

Period of Performance: January, 2018 - December, 2018

Summary Description: The AEROKATS and ROVER Education Network (AREN) introduces NASA technologies and practices in authentic, experiential learning environments. Low-cost instrumented systems for in-situ and remotely sensed Earth observations include kite-based “AEROKATS”, and remotely controlled aquatic and land-based “ROVERS”.

Science Focus: Earth Science **Audience(s):** Middle School, High School, College, Life-Long Learners

Region(s) Served: United States

Website: <http://globe.gov/web/aren-project>

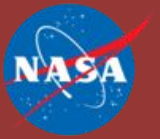
Current Partnerships Team Members and Institutions



- Anasphere, Inc. - John Bognar
- Chesapeake Bay Environmental Center - Vicki Paulas, Alissa Quinton, and Judy Wink
- Goddard Space Flight Center -- Geoff Bland, Brian Campbell, Patrick Coronado, Ted Miles, Kay Rufty, Sallie Smith
- Montana State University -- Kelly Boyce, Jamie Cornish, Kim Obbink, Suzi Taylor
- Public Lab -- Margie Cohen, Shannon Dosemagen, Jeffrey Warren
- University of Maryland Eastern Shore -- Willie Brown, Christopher Hartman, Xavier Henry, Abhijit Nagchaudhuri
- University of South Florida -- Jonathan Gaines
- Washington College -- Jemima Clark, Doug Levin
- Wayne RESA -- David Bydlowski, Andy Henry



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Evaluator: Dr. Anil Aranha

The AREN Project has been operational for a total of 30 months. Over this period of implementation of the project, the stated project goals were reduced from the initial 4 goals to 2 goals - enabling STEM education and leverage through partnerships - to permit an improved focus of the project and also provide achievable outcomes.

Enabling STEM Education: The AREN project had an impact on a total of 2,165 learners at different age and education levels.

Partnerships: The year 2018 may be considered a transition year as regards this goal, due the fact that 'partner' and 'partnership' has been discussed at various organizational levels through greater part of the year and has only recently been better understood. Nonetheless, the AREN project has made significant progress towards the 3 (or 20) project goal with agreements in the works with 5 organizations

Opportunities

Opportunity to reach out to the entire world-GLOBE community through the potential of an engineering wind challenge.



Areas of Concern

The major change taking place in the AREN Project is a change in evaluator. Dr. Anil Aranha has been our evaluator since the beginning of the project. Thanks to Anil for his hard work and dedication to the AREN Project. Anil not only did the evaluation for the AREN Project, but he also served as the logistics person for the 2018 GLOBE Midwest Student Research Symposium, held at Wayne State University School of Medicine, in Detroit MI. The success of the symposium is due in large part to the work of Dr Anil Aranha. Unfortunately the AREN team is looking for a different direction in evaluating the project. The new evaluator/team will be selected by the end of 2018.

Measurable Achievement

Publications:

- NASA Spinoff Publication -- NASA Kite Invention Spurs Ever-Growing Educational Program -- https://spinoff.nasa.gov/Spinoff2018/ee_8.html
- GLOBE Blog -- For GLOBE Teacher Diana Johns, Every Day is Earth Day --
- Public Lab Publication -- Building Miniature Kites at a Family Science Night -- <https://publiclab.org/notes/SuziT9/03-08-2018/building-miniature-kites-at-a-family-science-night>
- NISENet Publication -- NanoDays Transform MSU Family Science Night at Montana State University -- <http://www.nisenet.org/blog/post/partner-highlight-nanodays-transforms-msu-family-science-night-montana-state-university>

Project Goal 1 -- Enabling STEM Education Project Outcome: Increased the number of STEM experiences to 6000 through 2018 with the project goal of over 10,000 by 2020. There were approximately 100 learners in 2016, 4000 in 2017 and 2000 in 2018 to total the 6000 through 2018.

Project Goal 4 -- Leverage Through Partnerships Project Outcome: Partner with three organizations by 2020. Presently working with 5 organizations to develop partnerships.



SME Connections and Cross-Collaborations

The AREN Project continues its partnerships with nine SMD co-collaborators. The three that we are most actively involved with are:

- Southwestern Community College -- "TE: Smokey Mountains STEM Collaborative: Bridging the Gaps in the K-12 to Post-Secondary Education Pathway"
- University of Alaska, Fairbanks -- "Arctic and Earth Signs"
- University of Toledo -- "Mission Earth: Fusing GLOBE with NASA Assets to Build Systemic Innovation in STEM Education"

Cross-Collaboration Activities, with these three, have included:

- Warming Arctic/GLOBE Student Research Symposium exchange with Elena Sparrow and Katie Spellman
- Smoky Mountain STEM Collaborative with Matt Cass
- Two Days Training at Tennessee State University to train staff and prepare for upcoming Climate Course featuring AEROKATS.
- Mission Earth – Engineering Team Meeting and cross-collaboration at the GLOBE NARM meeting
- US GLOBE and Mission Earth – GLOBE Midwest Student Research Symposium
- AREN Training for Arctic SIGNS Team in Bozeman, MT
- GLOBE Mission Earth Professional Development Institute with AREN Training in Toledo, OH in Partnership with Palmyra Cove

Look Ahead

The AREN Project is looking forward to the future in 2019. Below is a list of the major plans for 2019:

- GLOBE / AREN Engineering Campaign Implementation
- GLOBE / AREN Field Campaign
- Hosting the 2019 GLOBE Annual Conference in Detroit, MI
- Anasphere will be further developing and refining ThermoPod hardware and software. Anasphere will also arrange supporting visits to SKC to support their adoption of AREN hardware and procedures.
- Develop plan for sustainment phase.
- Montana State University will begin developing a series of short, self-paced online modules to help educators (and the public) understand the kite-flying aspects of AREN.

- Continue to pursue potential partnerships with local, regional and national networks.
- More accessible airborne sensor packages to more curricula and guidance around NDVI software and hardware with a larger group of people beginning to work on NDVI, DIY aerial imaging, and AREN priority topics.
- Have fewer barriers to good quality, accessible science learning through Public Lab contributions within the AREN project.
- The AREN community has identified student researchers at UMES for the Summer of 2018 to embark in discovering the methods learned from previous classroom practices and promote innovation of kite-designs and development, data management, analysis and techniques to engage the AREN user community for partnership.



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The AREN Project Increased the number of STEM experiences and content from less than 100 learners in 2016, to over 4000 by 2017 and to over 6000 by 2018, with the goal of over 10,000 by 2020. Over 2000 Learners participated in the AREN Project at various levels of instruction and participation in 2018. By developing partnerships, the potential for AREN Learners is increased.

**5
Potential
Partnerships**

At this time, work on partnerships is taking place with Earth Force, MI STEM, BSCS (FieldScope), American Kitefliers Association and the National Park Service.

**Over 50
Events for
Professional
Development and
Training**

The AREN Project is involved in many activities and events to promote professional development and AREN training. Events took place at: local, state, national and international conferences, such as AGU, NSTA, GLOBE; GLOBE Webinar; GSFC; Chesapeake Bay Environmental Center; Montana State University; Madonna University; Individual Meetings; etc.

**Over 2000
Learners**

Over 2000 Learners participated in the AREN Project at various levels of instruction and participation in 2018:

- Wayne RESA -- 1260 Students and 200 Adult Learners
- University of Maryland Eastern Shore -- 40 Undergraduate Learners ENGE 150 (2 Semesters)
- Goddard Space Flight Center -- 100 Adult and Student Learners
- Chesapeake Bay Environmental Center -- Over 120 Student and Adult Learners
- Montana State University -- 110 Adult Learners and approximately 200 Student Learners
- University of South Florida -- 200 Undergraduate and 6th Grade Learners