

Civil Air Patrol (CAP) Aerospace Education (AE) Program

HISTORIC BACKGROUND

The Civil Air Patrol Aerospace Education Program has been a strong contributor to Aerospace Education since 1946...

On July 1, 1946, Public Law 476 established CAP as a patriotic and educational organization and an “instrumentality of the United States,” a unique status similar to that accorded the American Red Cross. After WWII, air search and ground rescue became CAP’s primary operational mission, along with the education and training of “air-minded” and patriotic youth through the CAP cadet program. Cadet orientation flights offered many young people their first airplane ride. Led by educators Dr. Mervin Strickler and Jack Sorenson, a well-planned aviation curriculum was developed for CAP cadets and was soon adopted in high schools and colleges across America.



In 1957, when the Soviet Union launched Sputnik, the world’s first artificial satellite, America was astounded and moved into high gear. Early efforts to track satellites involved a system of ground observers scanning the nighttime skies. Satellite passage was so fast – 20 seconds from horizon to overhead to horizon – that ground personnel could only radio their timing of these events as “See – Center – Saw.” How to train for this? How to simulate the passage of a satellite overhead? Air Force jets flew too fast or too high, so CAP planes towed a low-wattage light bulb protected in a low-cost aerodynamic shape: a bathroom plunger! In the nighttime sky, the set-up was exactly as bright at 7,000 feet as an orbiting satellite in space. CAP instantly became a national force multiplier in its ability and viability to provide simulation capabilities for training purposes. [History](#)



FAST FORWARD TO 2012

“Science is more essential for our prosperity, our security, our health, our environment, and our quality of life than it has ever been.” President Barack Obama

CALL TO ACTION: In 2005, the National Academies of Science, Engineering, and Medicine prepared a report, *The Gathering Storm*, that concluded that America was in substantial danger of losing its economic leadership position and suffering a decline of the standard of living of its citizens because of a looming inability to compete for jobs in the global marketplace; this due to a lack of emphasis and interest in science, technology, engineering, and math (STEM) career development.

The 2010 volume, [Rising Above the Gathering Storm, Revisited](#), explores the crisis America still faces. Addressing America’s competitiveness challenge will require many years, if not decades. The 2010 [America COMPETES Reauthorization Act](#) is intended to help offset this deficiency. Yet, continually looming is lack of student interest, lack of adequate funding, and lack of training for the educators tasked to resolve this national crisis. Enter [Civil Air Patrol](#)...

CAP, as the Auxiliary of the United States Air Force, *and*, as a humanitarian, non-profit organization, has garnered the support and commitment of its 61,000+ unpaid professional members, alongside a four-person AE team at the CAP National Headquarters in Montgomery, AL, and has answered the nation's "call to action" to prepare our nation's youth to be patriotically and technologically prepared for the global demands of the future. Although CAP's AE Program has been making significant contributions to this effort for over 65 years, it has embraced a 21st century leadership role with restructured, revised, and re-energized products and programs more relevant to today's standards of learning and tomorrow's STEM workforce needs. AE's interdisciplinary products and programs engage youth in an applicable, inquiry-based learning framework that supplements core subjects and enhances traditional learning. These academic standards-based products and programs are provided to educators at no cost, a fact that helps to offset the lack of local, state, and federal funding for educational programs.

CAP is tasked by Congress to promote Aerospace Education to its members and the general public to share the importance of aerospace power and the pivotal role it plays in the security of our nation. To accomplish this mission, CAP provides AE products and programs to its 27,000+ cadets (ages 12-20), 35,000+ adult members, and 2,000+ teacher members who impact over 200,000 general students annually.

In addition, CAP trains its unpaid professional members in cutting-edge technology that continues to sustain CAP's reputation and recognition as a national force multiplier, especially in emergency situations. High-level technology provided by CAP, such as hyperspectral imaging and Surrogate Predator training (remotely piloted aircraft with video capabilities replicating the early efforts of 1957 satellite tracking training) are cost-effective programs conducted by highly-trained CAP members.

New CAP educational products aligned with national academic standards pertaining to Robotics, Remotely-Piloted Aircraft, Satellite Tracking & Imagery, and Cyber Security help inspire youth toward technological careers that will help America maintain national security.

CIVIL AIR PATROL – SATELLITE TOOLKIT
(CAP-STK) AEROSPACE PROGRAM



In an effort to disseminate current and relevant national AE outreach information to its members and the general public, CAP publishes a quarterly [AE Newsletter](#); provides online daily [Volunteer Now](#) stories from the field; disseminates a monthly [AE E-Newsbrief](#) that includes a one-stop resource document of current events and opportunities for grants, awards, contests, and programs; maintains an [AE website](#) with an ever-evolving repository of resources, programs, and products; and conducts AE workshops and seminars throughout the nation.

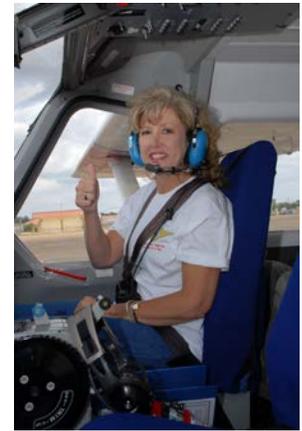
To recognize outstanding efforts of its members who promote AE both in local CAP units and in organizations across the nation, CAP provides a array of local and national AE awards for outstanding cadets, senior members, and teacher members. To perpetuate the education of its members, CAP offers flight and academic scholarships and college credit to CAP cadet, adult, and teacher members, as well as specific regional and national training symposiums for AE Officers and teacher members.

To provide strategic AE leadership, CAP's National Aerospace Education Officer, Lt Col Mike McArdle, has created diverse Leadership Teams tasked with specific responsibilities to perpetuate the momentum, funding, credibility, and impact of the CAP AE program across the country. These volunteer teams are working alongside the National Headquarters staff to promote and support existing and new programs, establish partnerships, and provide professional development opportunities, scholarships, financial assistance, symposia, and programs that involve schools and universities. Several [CAP AE Officer Schools](#) provide professional development for AE program implementation.



CAP'S CONTINUING AND EMERGING AE PROGRAMS

** To perpetuate the efforts of educators, educational institutions, museums, and youth-development organizations interested in promoting STEM subjects and careers, CAP is dedicated to the support of a special [AE Membership \(AEM\) program](#) that includes membership benefits of over [30 free K-12 educational products](#), opportunities to participate in grants, awards, college credit, professional development, and Teacher Orientation Program (TOP) Flights for college students and adults.



** A special CAP teacher member benefit and unique professional development opportunity is provided through free [Teacher Orientation Program \(TOP\) workshops and flights](#) in CAP planes to give teachers new aerospace knowledge and excitement that is transferred back to the classroom.

** To energize teachers' interest in using AE to supplement their curriculum, CAP partners with the Air Force Association (AFA) and other organizations and industries to coordinate exciting summer teacher workshop trips via military airlift to locations of interest around the country. At each venue, teachers are introduced to aerospace icons, industry, organizations, educational institutions, adventures, museums, and materials/resources, etc. Recent locations have been Dayton, Ohio; Kennedy Space Center; and Albuquerque, NM. The 2012 trip took educators on a C-130 military aircraft from Maxwell AFB, AL to Edwards AFB, CA. 45 participants explored aerospace career options at the Mojave Air and Space Port, seeing WhiteKnight 2 and SpaceShip 2 being docked for experimental training; the Jet Propulsion Laboratory, viewing the von Karman Museum and the Mars Rover in action; and Edwards AFB and Dryden Flight Research Center, touring the UAV Global Hawk facility and the SOFIA (Stratospheric Observatory for Infrared Astronomy) airplane, as well as receiving educational resources and flying F-18 simulators. Experiencing a large Wind Turbine farm, participating in educational tours at the Yanks Museum, and taking sailplane flights added new components to the 2012 educational experience. Such trips result in camaraderie, networking potential, and unique educational experiences about STEM career options to share with a diverse group of students and other educators.



** To instill early interest in STEM subjects, CAP developed a formal, grade-level specific K-6 [Aerospace Connections in Education \(ACE\) Program](#) which uses the aerospace theme to promote academics, character education, and physical fitness for young people. All program curriculum materials, classroom sets of educational items, t-shirts, and plaques/certificates are provided to educators at no cost. CAP and AFA members, as well as other community members, are encouraged to volunteer to teach ACE lessons, thus, providing positive role models and career mentors for these young students. Each year, the program expands (64% in 2012) and there is a 91% intent-to-return rate of teacher participants. Standardized science thinking scores are showing 26% improvement with ACE participation. Currently, about 750 teachers and over 20,000 students are involved in the ACE program nationwide. This program enables under-represented gender and minority youth an opportunity to experience rigor and relevance toward future career choices.



** To recognize exemplary educators who are going above and beyond educational expectations to engage young people in STEM enrichment programs, CAP has created a [National AE Teacher of the Year Award](#). The teacher is a guest at CAP's annual national conference and is presented a plaque and \$1,000 award during the Awards Banquet.

** To fund innovative STEM initiatives, CAP's partner organization, the [Air Force Association](#), has donated over \$360,000 since 1996 for CAP to disseminate quarterly \$250 grants to its units and K-12 teacher members. Over 300,000 young people have been impacted by projects conducted via this grant program. Grant recipients provide after-action reports that indicate the high-level of appreciation for seed money to conduct enrichment programs for cadets and other youth of America.

** To reward over 1,200 CAP units and classrooms for implementing hands-on STEM activities with over 50,000 youth and adults annually there is the free [Aerospace Education Excellence \(AEX\) Award Program](#). CAP provides award plaques and participant certificates upon completion of the program.

** To build a more diverse organizational structure and give under-represented gender and minority youth greater opportunity for AE/STEM development and career exploration, CAP offers the [Cadets at School Program](#) for grades 6-12. Usually implemented as an after-school program, youth are becoming involved in CAP's exciting form of character education that uses the students' enthusiasm for aviation, space, and technology as a motivator. This program expands the traditional [CAP Cadet Program](#).

** To allow [CAP cadets](#), ages 12-20, challenging individual achievement opportunities on nationwide military installations, CAP encampments develop self-discipline and teamwork while broadening an understanding of aerospace.

** To ignite interest in aviation, CAP continues to provide both powered and glider orientation airplane flights for CAP cadets, as well as JROTC and ROTC cadets when their funding allows. CAP cadets can even work toward earning a pilot license through their earnest [participation with CAP](#).

** To provide [academic and flight scholarships](#) for deserving CAP cadet and adult members, over \$350,000 worth of scholarships are offered annually.

** To fulfill the competitive spirit in youth, CAP has developed competition-related training programs and products for cadets and students to work with their leaders to participate in worthy national competitions:

- [AFA's CyberPatriot Program](#) - A new CAP CyberSecurity module and interactive internet [portal](#) has been developed that will allow cadets and high school students to become familiar with, and interested in, AFA's CyberPatriot program participation. [All CAP units and high schools are urged to compete](#), CAP has earned the All Service Division National CyberPatriot Championship for 2011 and 2012, as well as the new Cyber Forensics 2012 National All Service Division competition. Congratulations to the 2012 All Service Division champion, the Civil Air Patrol's Colorado Springs Composite Squadron and to the Open Division champion, Alamo Academies from San Antonio, TX. CAP's SD Big Sioux Composite Squadron and Lewis and Clark High School won the new 2012 component of the competition, the Cyber Forensics program. CAP has enrolled 261 teams for the 2013 CyberPatriot V program, the highest number in the All Services Division of the program. A third national championship is being actively sought!



- **FIRST Robotics** and **BEST Robotics** Challenges- CAP's new Robotics module provides introductory Robotics activities with opportunities for further challenge, as desired.
- **National Aeromodeling Championship**- CAP's new Remote Controlled Aircraft module being developed and the **CAP Model Airplane and Remote Control Project (MARC)** will also help promote interest in and preparation for CAP's "Surrogate Predator" Remotely Piloted Aircraft training capabilities and new career options of RPAs.
- **Team America Rocketry Challenge**- CAP's three-level Rocketry program is being revised, allows cadets and students to receive a Rocketry badge for completion, and prepares youth for TARC competition. An advanced Rocketry book to be published soon will provide enhanced rocketry opportunities.



** To ensure CAP's cadets and America's middle and high school students have interesting and challenging AE products, the CAP's six *Aerospace Dimension* modules and the 675-page, full color comprehensive textbook, *The Journey of Flight*, have been revised for currency and additional inquiry-based STEM activities. There is also an **online repository of STEM resources** for use by **cadets** and educators nationwide.

** To enhance interest in the CAP's Emergency Services component of Remote Sensing and Hyperspectral Imaging, a new DVD with remote sensing activities has been developed entitled CAP-TERS (Civil Air Patrol- Teachers Educational Remote Sensing).

** To provide a continuum from CAP's 1957 training to track Sputnik, new **Satellite Tool Kit (STK)** online scenarios and activities have been developed for all CAP members who wish to obtain a STK CD and license for use on any computer---compliments of Analytical Graphics Inc (AGI).



** To further the interest in satellite imagery, an associated CAP Satellite Imagery module has been completed, as well. These online resources are found at **Lessons and Other Resources**.

** To deliver information about a variety of STEM-related careers associated with aviation and space, a new online **Aerospace Careers module** will continue to evolve with current career options, educational pathways, salary ranges, etc.

** To expose AE careers to CAP cadets, **special career exploration activities** are offered by CAP volunteers around the country:

- Powered and Glider Flight Academies
- Pararescue Orientation and Advanced Academies
- Undergraduate Pilot Training Familiarization Courses
- Hawk Mountain Search and Rescue School
- Advanced Technologies Academies
- Engineering Academies
- Space Command Familiarization Courses
- Glider Center of Excellence Program
- Remote Control Academy
- Aerospace Manufacturing and Maintenance Academy



CAP'S STRATEGIC ALLIANCES TO PROMOTE AE

Through reciprocal partnerships and alliances with like-minded organizations, CAP AE Programs are being disseminated to educators and youth nationwide, fulfilling CAP's and other organizations' goal of developing tomorrow's aerospace and STEM leaders. CAP and alliance organizations promote reciprocal memberships and program promotion, as well as other mutually-beneficial initiatives:

** [Air Force Association](#)- >>>[AFA provides CAP](#) almost \$23,000 annually to fund CAP Unit and Teacher AE Grants; ribbons and medals for squadron-level cadets of the year; and a National CAP AE Cadet of the Year Award. >>>[CAP provides AFA](#) complimentary AE memberships and materials to all AFA Chapter and State Teachers of the Year and for any teachers sponsored/supported by AFA or attending AFA workshops; materials, personnel, professional development, and TOP Flights to support AFA AE workshops; AEX Program materials for AFA chapters; and any of the above to support [AFA's Museum Initiative](#). See weblink at www.capmembers.com/afa.

** [Air Force Sergeants Association](#)- AFSA will be providing mentors for CAP cadet AE and leadership programs and a National CAP NCO Cadet of the Year Award.

** [Air Force JROTC](#)- CAP offers complimentary orientation airplane flights to JROTC cadets and complimentary AE membership and materials to JROTC instructors.

** [Air Force ROTC's Arnold Air Society \(AAS\) and Silver Wings \(SW\)](#)- CAP provides AAS/SW teams across the nation with ACE materials, special certificates and plaques, and instructional manipulative items to support the college students' efforts in [the AAS/SW Elementary STEM Orientation Program](#).



** [Air Force STEM Outreach Coordination Office](#)- CAP is working with the AF STEM Outreach Coordination Office in Washington, D.C. and their STEM representatives on each AF installation to provide resources and support in their STEM outreach initiatives. **NOTE: Through the work with this office, CAP was awarded a \$250K [National Defense Education Program \(NDEP\)](#) grant to provide CAP units and schools, to include AF JROTC classes, kits to promote STEM education & careers.**

** [Analytical Graphics, Inc](#) – AGI provides free licenses for Satellite Tool Kit (STK) to any CAP member. >>> CAP includes an assortment of associated STK lesson plans on the AE website.

** [Association of Model Aeronautics](#)- AMA provided all teacher members a R/C Instructional DVD and is providing free AMA membership and support to CAP cadets. >>> CAP is promoting AMA's remote control aircraft program to CAP membership with partnership initiatives being initiated nationwide.

** [DoD STARBASE](#)- CAP provides class sets of AE materials and lesson plans embedded with a drug-free message to all teachers and classes attending the over 70 STARBASE Academies nationwide, impacting over 70,000 STARBASE teachers and students annually, and supports elementary/middle school STARBASE initiatives with supplemental AE materials.

** [Experimental Aircraft Association \(EAA\)](#)- CAP works with the EAA on many collaborative aviation initiatives.



** [Federal Aviation Administration Aviation and Space Education \(AVSED\)](#)- FAA and CAP are supporting each other's organizations with promotion of events, programs, products, etc. via websites and informational publications; CAP has provided TOP flights, workshop sessions, and materials for educators at FAA conferences.

** [FLIR Thermal Imaging Systems, Inc.](#) – FLIR has provided funding for CAP's K-6 Aerospace Connections in Education (ACE) program for the 2011 and 2012 program years.

** [Lightspeed Aviation Foundation](#) – Lightspeed Aviation Foundation has provided \$10,000 grants to support the CAP K-6 Aerospace Connections in Education (ACE) program for three consecutive years.

** [National Association of Rocketry \(NAR\)](#) – CAP promotes and supports the NAR with members' participation in Model Rocketry programs and national Team America Rocketry Program competition.

** [National Aeronautics and Space Administration \(NASA\)](#) – CAP promotes and utilizes NASA products and programs.

** [National Coalition of Aviation and Space Education \(NCASE\)](#) – CAP is a member of NCASE, a collaborative organization promoting aviation and space education and workforce development.

** [Real World Design Challenge](#)- CAP promotes the RWDC to CAP's 27,000 cadets and over 2,000 educators nationwide. CAP members are encouraged to form and mentor teams of cadets and/or students in grades 9-12, working through the offices of the states' Governor or Lt Governor.

** [State Departments of Education](#)- CAP provides TOP flights, workshop sessions, and materials for educators; is assisting the [Southern Region Education Board](#) with development of an AL high school Aerospace Engineering technical course; and has been requested to offer CAP's ACE program to elementary schools to prime students' desire to enter the AE track in high school.

** [State Departments of Aviation](#)- CAP provides TOP flights, workshop sessions, and materials for educators who work with Departments of Transportation- Aviation, under the auspices of the FAA.

** [State Science Teachers Associations](#)- CAP provides TOP flights, workshop sessions, and materials for educators working with state associations under the [National Science Teachers Association](#).

** [Space Exploration Educators Conference \(SEEC\)](#)- CAP annually provides over 60 teachers the Teacher Orientation (TOP) Flight, several conference sessions, and materials for teachers attending the internationally-attended SEEC in Houston, TX, and is recognized as a conference partner

** [US Science and Engineering Festival](#)- CAP has been a Volunteer Outreach Team sponsor and provided STEM materials for thousands of youth at the national festival in Washington, D.C..

** [US Space and Rocket Center](#)- CAP has provided over 80 teachers the Teacher Orientation (TOP) Flight, workshop sessions, and materials for teachers from across the nation attending summer Educators Space Camp in Hunstville, AL.



**** Youth Organizations, Educational Institutions, Museums, and Air Shows-** CAP provides programs, products, and volunteer personnel support for special events to promote AE to the general public, youth, and educators nationwide.



** See [CAP Volunteer Magazine](#), pages 52-55, about CAP's AE Alliances, and pages 26-30 about AFA's CyberPatriot program.

IN SUMMARY

The Civil Air Patrol AE Program is continuing its long tradition of supporting youth development programs to prepare young people for exciting STEM careers. Addressing current needs of educators, as well as needs of CAP cadets and the nation's students in formal and informal settings, is a priority for the CAP AE team. *Points of Pride* of the CAP AE Program initiatives to introduce a diverse population of students and adults to AE as a pathway toward the development of a patriotic and technologically-prepared future workforce are:

- the dynamic free K-6 ACE Program that ignites early AE interest;
- the Cadets at School Program for middle and high schools;
- complimentary TOP flights and workshops for educators;
- the ever-expanding repository of engaging and evolutionary AE products and programs provided free to our nation's educators; and
- the positive role models provided youth by CAP adults and older cadets, and by partner organizational volunteers.



CAP's AE Program is the recipient of two distinguished 2011 national Aerospace Education awards presented by the National Coalition of Aviation and Space Education: the [Crown Circle](#) and [Mervin K. Strickler](#) Awards for Aerospace Education Leadership.

CAP's AE Program has shown consistent and enduring support for Aerospace Education for over 65 years and is aggressively pursuing new and innovative programs to benefit the future technological and security issues of our country by mentoring, inspiring, and educating the workforce of tomorrow.

For more information, contact ae@capnhq.gov and/or see www.capmembers.com/ae.

