

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- to simulate this satellite passage! 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 2014

Current National STEM Status: America, historically the most innovative country in the world, is in dire need of a next generation workforce of STEM experts. Yet, America's youth are lagging in STEM interest, competence, and career pursuit. Compounding the issue and continually looming is lack of adequate funding and lack of training for the educators tasked to resolve this national crisis. Immediate attention is needed in educational institutions, youth and aerospace organizations, and industries to provide rigorous and relevant opportunities for experiential STEM learning that will lead to pursuit of aerospace-related careers.

Civil Air Patrol Action Plan: CAP is addressing this national issue by developing engaging and relevant K-12 aerospace products and programs that when used in collaborative initiatives with like-minded organizations will provide vocational and avocational aerospace opportunities for K-12 youth across the nation.

CAP Aerospace Education Program Goal: Using aerospace as the spark, generate enthusiasm among our nation’s youth toward STEM-related subjects and careers to ensure America’s status as a leader in STEM workforce development and national security initiatives.

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*](#)...

[*Civil Air Patrol*](#) as the official Auxiliary of the United States Air Force, *and*, as a humanitarian, non-profit organization, has garnered the support and commitment of its 61,000+ volunteer members nationwide, alongside a three-person Aerospace Education team at CAP National Headquarters at Maxwell Air Force Base, 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 aerospace demands of the future. Although CAP's AE Program has been making significant contributions to this effort for 67 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 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 is helping to offset the lack of local, state, and federal funding for educational programs.

CAP's unpaid professionals, both in community CAP squadrons *and* in classrooms, youth organizations, and aviation museums, are trained in technology and educational programs that continue to sustain CAP's reputation as a national resource of choice. High-level technology usage, such as Forward Looking Infrared Radar (FLIR thermal imaging sensors for Search & Rescue missions) and Unmanned Aerial Vehicle training capabilities are conducted by CAP adult and cadet members. Using CAP subject matter experts as mentors to youth, new CAP educational products pertaining to Robotics, Flight Simulation, Remotely-Piloted Aircraft, Cyber Security, and Satellite Tracking and Imagery will help inspire youth toward aerospace careers to maintain national security for the future.

In an effort to disseminate current and relevant national AE outreach information to its members and the general public, CAP publishes a quarterly *Volunteer* magazine, provides online daily [*Volunteer Now*](#) stories from the field, and maintains an [*AE website*](#) with an ever-evolving repository of resources, programs, and products..

To recognize outstanding efforts of its members who promote Aerospace/STEM Education across the nation, CAP provides a array of local and national AE awards for outstanding cadets, senior members, and educator members. To perpetuate the education of its members, CAP offers flight and academic scholarships and college credit to CAP cadet, adult, and educator members, as well as specific regional and national training symposiums for [*CAP AE Officers*](#) and educator members.

To provide strategic AE leadership, the volunteer National AE Officer, Lt Col Mike McArdle, has developed diverse Leadership Teams tasked with specific responsibilities to further perpetuate the momentum, funding, credibility, and impact of the CAP AE program across the country. These teams are working to promote and support existing and new programs, establish partnerships and alliances, and provide professional development opportunities, scholarships, financial assistance, symposia, special studies, and programs that involve schools, youth organizations, museums, and universities.



CAP'S CONTINUING AND EMERGING AEROSPACE/STEM EDUCATION PROGRAMS

** As a unique professional development opportunity, educators across the country are provided free [Teacher Orientation Program \(TOP\) Flights](#) in CAP planes to give them new aerospace knowledge, confidence, and excitement that is transferred back to the classroom or youth organization.



** To perpetuate the efforts of educators, educational institutions, museums, and youth-development organizations interested in promoting STEM subjects and careers, CAP offers a special AE membership program that includes benefits of over 30 free [K-12 educational products](#), [online aerospace education links](#), TOP Flights, and opportunities for grants, awards, college credit, and professional development. Over 3,000 educators currently participate, impacting about 300,000 youth annually.



** To expose educators to a variety of aerospace/STEM careers to share with their students, CAP partners with the Air Force Association to provide an annual summer STEM Career Exploration trip to sites such as Albuquerque, NM; Dayton, OH; Kennedy Space Center, FL; Edwards & Mojave, CA.

** To fund innovative STEM initiatives, CAP's partner organization, the [Air Force Association](#), has donated over \$375,000 since 1996 for CAP to disseminate quarterly \$250 grants to its units and K-12 educator members. Over 370,000 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 funds to conduct enrichment programs for cadets and other youth of America.

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



** To reward the over 1,400 CAP units and classrooms for implementing Aerospace/STEM activities with over 68,000 youth and adults in the [Aerospace Education Excellence \(AEX\) Award Program](#) annually, CAP provides award plaques and participant certificates upon completion of the program.

** To instill early interest in STEM subjects, CAP developed a formal, free, 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. CAP members and others are encouraged to volunteer to teach ACE lessons, thus, providing positive role models and career mentors for these young students. Since its 2007 prototype program inception, the program has impacted almost 100,000 students with an early interest in aviation and space. Program efficacy data shows a 26% increase in science thinking skills; a 91% teacher retention rate; and a 46% increase in student knowledge of and interest in aerospace. Quick program overview: [HERE](#). Presenting Sponsor: [The Air Force Association](#); Supporting Sponsors: [Lightspeed Aviation Foundation](#) and [FLIR Systems, Inc.](#)



** 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:

- [American Model Aeronautics Challenge](#)- CAP's new Remote Controlled Aircraft and follow-on Unmanned Aerial Vehicle modules being developed will help promote interest in and preparation for CAP's remotely-piloted aircraft training capabilities & career preparation.

- [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 (note: CAP Cadet teams earned the 2011 and 2012 National CyberPatriot All Services Division Championship). [All CAP units and high schools are urged to compete](#), Career exploration and preparation for future national security is the end result of this program.



- [FIRST](#) and [BEST Robotics](#) Challenges- CAP's new [Robotics module](#) was developed to provide introductory Robotics activities for further challenge and career development.

- [Team America Rocketry Challenge](#)- CAP's three-level [Rocketry program](#) allows cadets and students to receive a Rocketry badge for completion and prepares them for TARC competition. An advance Rocketry module is due soon.



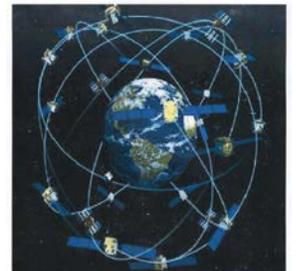
** To allow CAP cadets challenging individual achievement opportunities on nationwide military installations, CAP encampments develop self-discipline and teamwork while broadening an understanding of aerospace.

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

** To further interest in satellite imagery and usage, the [Satellite Tool Kit \(STK\)](#) online scenarios and activities have been developed for all CAP members--compliments of developer and CAP partner, [Analytical Graphics Inc \(AGI\)](#).

** To provide youth information about a variety of aerospace career options and educational pathways, a CAP online [Aerospace Careers Module](#) is ever-growing.

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



** To build a more diverse organizational structure and give under-represented and minority youth greater opportunity for aerospace career preparation, CAP has added the [Cadets at School Program](#) to its traditional cadet unit format for grades 6-12. Usually implemented as an after-school program, at-risk students are given the opportunity to become involved in CAP's exciting youth development program using their enthusiasm for aerospace and technology as a motivator.

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



** To recognize CAP's contributions to youth and educator Aerospace/STEM education programs, CAP has received several national awards in the past three years: National Coalition of Aviation and Space Education's two top national awards: [2011 Crown Circle and Mervin Strickler Aerospace Excellence Awards](#); 2013 [Cyber Security Exchange Innovator Honorable Mention](#) for Innovative Use of Cyber Security Technology Resources during MertTalk's [Cyber Security Confidence Awards](#); and 2013 Air Force Association [Chairman's Aerospace Education Award](#).



** 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 enable CAP units and educator members the tools needed to conduct STEM programs, CAP provides free STEM Kits in five career development areas: Astronomy, Flight Simulation, Model and Remote Controlled Aircraft, Robotics, and Rocketry in the [CAP STEM Kit Program](#).



** To promote 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](#)
- [Emergency Services Academy](#)
- [Civil Engineering Fam Course](#)
- [Aerospace Engineering Academies](#)
- [Aviation Business Academy](#)
- [National Blue Beret](#)
- [Advanced Technology Academies](#)
- [Hawk Mountain Search & Rescue School](#)
- [Space Command Familiarization Courses](#)
- [Model Aircraft & Remote Control Academy](#)
- [Manufacturing and Maintenance Academy](#)



CAP'S STRATEGIC ALLIANCES TO PROMOTE AE

Through reciprocal partnerships and alliances with like-minded organizations, CAP Aerospace/STEM Ed programs are being disseminated to educators and youth nationwide, fulfilling CAP's and other organizations' goal of developing tomorrow's aerospace leaders. CAP and [alliance organizations](#) promote reciprocal memberships and program promotion, as well as other mutually-beneficial initiatives. Some of CAP's partners include:

** [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. The AFA has just endorsed CAP's K-6 ACE Program by becoming the program's Presenting Sponsor. >>>[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; ACE Program materials for AFA chapters; and any of the above to support [AFA's Museum Initiative](#). More info at afa@capnhq.gov or www.capmembers.com/afa.



** [Air Force JROTC](#)- CAP provides flights to JROTC cadets and AE materials, STEM Kits, and TOP Flights to AFJROTC instructors

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

** [Air Force STEM Outreach Coordination Office](#)- CAP is working with the AFSOCO in Washington, D.C. & 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 \$450K [National Defense Education Program \(NDEP\)](#) funds to provide CAP units and schools, to include AF JROTC schools, materials to conduct STEM programs and projects.**

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

** [Association of Model Aeronautics](#)- provides free AMA membership to CAP cadets, and supports CAP's R/C aircraft programs nationwide >>> CAP provides free AMA's remote-control aircraft kits to CAP units and educators

** [Boy Scouts of America](#)- CAP provides volunteers and materials to help scouts achieve their Aviation Merit Badge; other synergistic events are mutually beneficial

** [DoD STARBASE](#)- CAP provides class sets of AE materials and lesson plans to all teachers and classes attending the over 70 STARBASE Academies nationwide, impacting over 70,000 5th grade STARBASE teachers/students annually, and, supports elementary/middle school STARBASE initiatives with supplemental AE materials

** [Experimental Aircraft Association \(EAA\)](#)- CAP & EAA collaborate on numerous aviation initiatives, to include CAP's cadet orientation flights being logged into EAA Young Eagle flight program and EAA providing complimentary memberships to CAP cadets, thus benefitting both organizations' youth flight initiatives



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

** [FLIR Systems, Inc.](#)- provides annual funding for CAP's ACE program to help support about 20,000 students annually

** [Lightspeed Aviation Foundation](#) – has provided grants to support the CAP K-6 Aerospace Connections in Education (ACE) program for the 2011-2013 program years, impacting about 20,000 youth annually

** [National Aeronautics and Space Administration \(NASA\)](#) – CAP promotes and utilizes NASA products to enrich STEM education initiatives

** [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 26,000 cadets and over 3,000 educators nationwide; CAP members are encouraged to form and mentor teams of cadets and/or students in grades 9-12, working through the office of the state's 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 (in states, regions and nations)

** [Space Exploration Educators Conference \(SEEC\)](#)- CAP has provided over 100 Teacher Orientation (TOP) flights, several conference sessions, and materials for teachers attending the internationally-attended SEEC in Houston, TX, and has been recognized as a conference partner

** [US Science and Engineering Festival](#)- CAP contributed as a Volunteer Outreach Team sponsor and provided AE materials and programs for thousands of youth at the national festival in Washington, D.C. in 2012

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



IN SUMMARY

The Civil Air Patrol Aerospace Education 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's 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;
- the free STEM Kit program for CAP units and educator members;
- complimentary TOP flights and workshops for educators;
- the ever-expanding repository of engaging and evolutionsal 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 has shown consistent and enduring support for Aerospace Education for 68 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.

