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# National Association of Rocketry Educator's Newsletter

February 2014

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## Your Minitature Cape Canaveral

Along with flying model rockets and helping educators teach STEM, I've worked at NASA for several decades as an aerospace engineer. I recently participated in a major test of a new tank to be used as the rocket body in the Space Launch System (SLS). This test was a keenly orchestrated event, connecting dozens of engineers each of whom operated a technical station integrated into the tank. It was quite exciting as everyone must do their job correctly at the right time for the plan to come together and the test to be successful. As I was supporting the test at my monitor, I remembered how much the NAR launches really are just like this NASA activity. The test conductor runs the rocket test much like a range director runs a launch. A model rocket range is set up and run the same way as a real rocket range, not just because that is fun; but because that's the best and safest way to launch. When your class launches rockets, they are not just modeling the rockets; they are also modeling the analysis, production, and operational processes of the aerospace industry. That's what we want them to do so they can learn how to organize resources and solve problems just like professional engineers. And who knows, eventually they may be hired into those jobs. What kind of launch is your school planning for this semester?

Aim high!

Vince Huegele  
NAR Education Chairman



## 2014 Team America Rocketry Challenge (TARC)

Registration for TARC 2014 is complete; there are 701 teams fully registered. This is a few less than last year's 725; but still a great number that is larger than the registration for 8 of the last 11 TARCs! Now the fun part begins -- we get to mentor these great young people

and give them opportunities to succeed in designing, building, and safely flying their rockets.

The TARC (<http://www.rocketcontest.org/>) is the world's largest rocket contest, sponsored by the Aerospace Industries Association (AIA) and the National Association of Rocketry in partnership with AAPT, DoD, NASA, and AIA member companies.

The top 100 teams from among all those who have entered will meet in a final fly-off competition on May 10, 2014 at Great Meadow, The Plains, VA. These top 100 teams will be selected based on the duration and altitude scores reported from local qualification flights that they conduct in front of an NAR Senior (adult) member observer at their choice of time up until the flight deadline of March 31, 2014.

### **NAR Support for Team America**

The NAR asks all of its Senior (adult) members and its Sections to take an active role in supporting TARC. This event offers a tremendously rewarding opportunity to teach rocketry skills to bright and enthusiastic young people and to "pay forward" to a new generation of rocketeers for the support that we once received from others when we were starting out in the hobby. Please use the attached [publicity handout](#) to get the word out about TARC. Details of the duties of a mentor or flight observer are available in our [Mentor Guide](#).

**Mentors** are adult (age 21 and above) members of the NAR who volunteer to serve as technical advisors and instructors or coaches to TARC teams. The role of the mentor is to get teams over the initial learning hump of mastering basic rocketry skills; they are not allowed to help teams with their final contest designs. Mentors may also serve as "qualification flight observers."

TARC team members can obtain [a current list of NAR Mentor volunteers](#).

**NAR Sections** help by listing all of their launches on the NAR "[Launch Windows](#)" web page and by providing free access to these launches and use of Section or personal launch equipment for any TARC team that needs to do a test or qualification flight.

Only certain **NAR-certified model rocket motors** of total impulse class "F" and below are approved for flight use in TARC 2014. They are enumerated in [this list](#).

### **NAR Site Owner Insurance**

TARC teams that need "site owner insurance" (insurance which protects the owner of the land used for a rocket launch) in order to gain access to a flying site for their local test and qualification flights may get this through the NAR, just like NAR Sections (clubs) can do. This insurance is available only for actual landowners (including schools and school boards), not for school officials who are concerned about personal liability. It is available for \$15, but only to teams whose teacher supervisor is a member of the NAR, and which have at least three student team members who are members of the NAR. You can apply for site insurance using [this printable form](#).

Key dates are approaching:

Feb. 1 - Complete first test flight (recommended)

**Mar. 1** - First TARC qualification flight recommended (teams this year can have three official qualification flight attempts as long as one of them is on or before this date)

Mar. 15 - Complete first official flight attempt

**March 31 - Submit qualification form to AIA**

Apr. 9 - Top 100 team selected  
May 10 - National Finals at Great Meadow in The Plains, VA

The NAR website provides additional information (<http://www.nar.org/TChallenge.html>). There is a superb new teacher resource posted on the TARC website page [http://rocketcontest.org/resources\\_educators.cfm](http://rocketcontest.org/resources_educators.cfm).

[Trip Barber](#)  
NAR 4322 L3  
TARC Manager



### **NAR Scholarship Program and Robert L. Cannon Award**

Did you know that if you are NAR member between the ages of 17 and 22 attending college or a vocational school that you may be eligible to receive a scholarship?

Are you a teacher or educator who uses model rocketry in the classroom? You are welcome to apply for a \$500 grant to use in your program.

In 2001, the NAR's scholarship and Robert L. Cannon educational awards were inaugurated at NARAM. Three NAR members received scholarships and two educators received Cannon award grants. For 2002, there were five Cannon awards and five scholarships presented to recipients. In 2003, there were four scholarships awarded to NAR members and three Cannon award winners. Since 2004, we have awarded 5 Cannon winners per year. Over the years the number of award winners have grown. This year we will award ten \$1000 scholarships, and ten Cannon \$500 grants.

**The deadline for Scholarships and the Cannon award applications is June 1st.**

Both of these programs are ongoing. See <http://www.nar.org/cannon.html> for details on how to apply. If you have questions concerning either program, please contact **Joyce Guzik, via email: [jquzik@mindspring.com](mailto:jquzik@mindspring.com).**

### **INSPIRING OTHERS:**

#### **Ready to Launch: State of Alabama and City of Montgomery Re-ignite STARBASE After Federal Government Strips Funding**

A hallway lined with stars leads down to a series of empty rooms once filled with children discovering a love of math and science. A flight simulator sits unused and a miniture version of the surface of Mars is no longer crawling with student-made robots.

But all of that is about to change..."What happened here could have been one of two stories," said Ann Sikes, executive director of the Montgomery Education Foundation. "It could have been something great that went away. Close the doors and lock it up...The other story was written because Montgomery is this community, coming together and saying we're not OK with doing this [closing the facility]."

The Department of Defense's [STARBASE program](#) focuses on elementary students, primarily fifth graders. The goal is to motivate them to explore Science, Technology, Engineering and Math (STEM) as they continue their education. The academies serve students historically under-represented in STEM. Students who live in inner cities or rural locations, those who are socio-economically disadvantaged, low in academic performance or have a disability are in the target

group. The program at Maxwell Air Force Base, Alabama, is one of many across the nation without funding as a consequence of the federal budget crisis. But this one is making a comeback thanks to a \$250,000 state grant and the intervention of the Montgomery Education Foundation.

Sikes learned about the program a few months ago when her non-profit group was asked to step in and take over the administration of the program by Alabama Governor Robert Bentley. The program now has a permanent foundation and, if the Defense Department reinstates its funding, the money would be contracted to Sikes' non-profit organization. She has her dreams for the program, starting with doubling the number of students by next year (providing opportunities for many more local schools), creating a summer program, and providing a STEM institute for teachers. Her foundation intends to work with area businesses such as Airbus and Lockheed to insure the doors of STARBASE remain open.



### **How to Build a Model Rocket**

NAR volunteers have produced 9 pages of excellent basic tutorial material on [how to build a model rocket](#) and a 45-minute instructional video for rocketeers of all ages on all the steps and techniques involved in building and flying a basic model rocket other NAR volunteers have produced. This instructional video has been divided into six short segments of 4 to 9 minutes duration and posted online by the NAR's TARC partners, the Aerospace Industries Association on their YouTube site.

The six segments are:

Part 1: [How Model Rockets Work](#)

Part 2: [Components of a Rocket](#)

Part 3: [Construction](#)

Part 4: [Finishing the Rocket's Fins](#)

Part 5: [Assembling the Rocket](#)

Part 6: [Painting the Completed Rocket](#)

A sincere thanks to all!

### **Fun iPhone app: 3D Sun**

Imagine holding the entire sun in the palm of your hand. Now you can. A new iPhone app developed by NASA-supported programmers delivers a live global view of the sun directly to your cell phone. Users can fly around the star, zoom in on active regions, and monitor solar activity.

The name of the app is "3D Sun" and it may be downloaded free of charge at Apple's app store. Just enter "3D Sun" in the Store's search box or visit <http://3dsun.org> for a direct link.

Realtime images used to construct the 3-dimensional sphere are beamed to Earth by the Solar-Terrestrial Relations Observatory (STEREO), a pair of spacecraft with a combined view of 87% of the solar surface. STEREO-A is stationed over the western side of the sun, while STEREO-B is stationed over the east. Together, they rarely miss a thing.

Telescopes onboard the two spacecraft monitor the sun in the extreme ultraviolet (EUV) portion of the electromagnetic spectrum. "That's why the 3D sun looks false-color green," explains Lika Guhathakurta, STEREO program scientist at NASA Headquarters. "These are not white-light images."

Many users say their favorite part is the alerts. The app comes alive on its own

when the sun grows active or when interesting events are afoot. For example, a recent alert notified users that a comet just discovered by STEREO-A was approaching the sun. When the comet was destroyed by solar heating, the app played a movie of Comet STEREO's last hours.

<http://www.nasa.gov/topics/solarsystem/features/iphone-sun.html>

Don't have an iPhone? Get your daily Space weather report at

[www.spaceweather.com](http://www.spaceweather.com).

It offers news and information about the Sun-Earth environment such as sunspots, solar conjunctions, aurora alerts and more.

## **Estes**

### **Follett Challenge**

Do you have a unique program that teaches students to use critical thinking, communication, creativity and collaboration? If you do, you need to enter the Follett Challenge. Show Follett how you're preparing students with these skills and you could win a grand prize of \$60,000 or some of the \$200,000 of Follett products.

### **Alan Shepard Technology in Education Award**

The Space Foundation, in partnership with the Astronauts Memorial Foundation and NASA, annually presents the [Alan Shepard Technology in Education](#) Award to recognize outstanding contributions by K-12 educators and district level personnel in the field of educational technology.

Educators who have demonstrated a commitment to inspiring students' interest in science, technology, engineering and math (STEM) may [apply now](#) to receive the 2014 Alan Shepard Technology in Education Award.

## **National Coalition for Aviation and Space Education**

### **Edward W. Stimpson and Dr. Harold S. Wood Scholarships**

The General Aviation Manufacturers Association (GAMA) announced the availability of two prestigious scholarships awarded annually to students who have excelled in or are pursuing aviation studies.

The Edward W. Stimpson "Aviation Excellence Award" is given to a graduating high school senior who has been accepted to and will be enrolled in an aviation degree core program at his or her chosen university or college. The award includes a \$2,000 cash prize and is named after Stimpson, who was a founder of GAMA and served as its President from 1970 to 1990 and from 1992 to 1996. Applicants are judged on the basis of academic skills, extracurricular activities, and an essay on what aviation means to the student and how he or she plans to pursue a career in aviation.

The Dr. Harold S. Wood Award for Excellence is given annually to a college student who is a flight team member at a National Intercollegiate Flying Association (NIFA) member school. The award comes with a \$2,000 cash prize and an engraved propeller trophy, and is named after Wood, founder and past executive director of NIFA. Students are judged on the basis of academic skills, both aviation-related and non-aviation-related extracurricular activities, and an essay about their future aviation plans.

Both applications are due April 18, 2014, and can be found on [GAMA's Web site](#).



## **Civil Air Patrol (CAP) Promotes and Supports Aerospace Education**

CAP [educational programs](#) (for its own members and the general public) help prepare American citizens to meet the challenges of a sophisticated aerospace society and understand its related issues.

CAP offers national standards-based educational products, including a secondary textbook, *Aerospace: The Journey of Flight*, and the middle-school-level *Aerospace Dimensions*. Aerospace Education Members can get classroom [materials and lessons](#) plans from CAP.

### **Civil Air Patrol Aerospace Library**

Dedicated to promoting and sharing Aviation, Air Force, CAP & NASA History, the folks at the Civil Air Patrol have put together a fantastic [library of rocketry resources](#)!

## **Great Explorations in Math and Science (GEMS) Teacher Handbook**

The GEMS Teacher's Handbook is both an introduction to Great Explorations in Math and Science (GEMS) and a clear explanation of the elements included in all GEMS guides available from the Lawrence Hall of Science, University of California, Berkeley. For the teacher considering integrating GEMS into his or her curriculum for the first time, the handbook describes the philosophy behind the series, its alignment with the National Science Education Standards, its flexibility in diverse settings, and the structure of its teacher's guides. For all teachers, including those already familiar with GEMS, the book provides teaching strategies and tips that apply to all inquiry-based science and math activities.

The handbook includes concise discussions on numerous teaching concerns, including assessing student performance, integrating GEMS activities into established curricula, and strategies for obtaining materials. It also provides techniques for handling particular challenges, such as what to do when you, the teacher, don't know the answer, or when students arrive at "wrong" conclusions. Full-page charts summarize the major skills, concepts, themes, and mathematics strands addressed in each of the GEMS guides. Recent editions of the handbook feature "blueprints" for building year-long curricula using GEMS and other activity-based programs.

[GEMS Teacher's Guides](#) are clearly organized, easy to use, and do not require any special background in math or science. Each classroom session includes an overview, materials list, and preparation steps, followed by clear, step-by-step instructions for effective classroom presentation. Background information is provided for the teacher, along with photographs, illustrations, and, often, examples of student work. Throughout each guide are comments on presentation strategies and practical advice to help the teacher, many suggested by teachers who tested the units.

## **Estes**

### **NEA Foundation Doubles Donors Choose Donations**

The NEA Foundation and DonorsChoose.org have helped fund hundreds of educators and their classroom projects, assisting thousands of students in the process. During the holiday season, teachers making requests will get an extra bonus--with the NEA Foundation doubling the funding required when donors donate to NEA members' projects. Check it out at [neafoundation.org](http://neafoundation.org).

### **NASA Needs Educators for Microgravity Experience**

NASA's Reduced Gravity Education Flight Program and the Teaching From

Space Office are seeking applications for teams of K-12 educators to participate in the MicroGravity eXperience, or Micro GX, project. This project gives students and educators across the country the opportunity to work together on an experiment to be tested aboard a microgravity aircraft. This incredible opportunity is open to any current K-12 classroom educator in the United States. Educators must also be U.S. citizens.

Micro GX activities begin with students and educators developing and proposing a reduced-gravity experiment. Selected educator teams will receive online professional development on classroom resources for microgravity, collaboration with a NASA mentor and a reduced-gravity flight. With combined input from their students and mentor, educator teams will design and fabricate their experiments to be tested and evaluated aboard an aircraft that flies approximately 30 roller-coaster-like climbs and dips to produce periods of microgravity and hypergravity, ranging from almost zero gravity to 2 g.

Seven teams of four to five educators from a single school or school district will be selected from this application process to participate in Micro GX. Participation will include an online microgravity course, commencing on Feb. 11, 2013, with a series of Web seminars with NASA personnel to initiate the development of the team's experiment. The highlight of the online course is traveling to NASA's Johnson Space Center in Houston, Texas, and participating in the Reduced Gravity Education Flight Program during the week of July 12-20, 2013. During the flight week, educators will fly and perform custom experiments in a reduced-gravity environment. Selected teams are responsible for all expenses associated with their travel and stay in Houston. The online course continues with activities beyond the flight experience through Aug. 26, 2013.

Educator teams interested in participating in Micro GX may submit a proposal no later than Jan. 9, 2013. For more information, visit [microgravityuniversity.jsc.nasa.gov/tfs](http://microgravityuniversity.jsc.nasa.gov/tfs) or send an email to [jsc-rgeducator@nasa.gov](mailto:jsc-rgeducator@nasa.gov).

### **2,856,575 Have Learned an HOUR of Computer CODE**

[Learn the basic concepts](#) of Computer Science with drag and drop programming. This is a game-like, self-directed tutorial starring video lectures by Bill Gates, Mark Zuckerberg, Angry Birds and Plants vs. Zombies. Learn repeat-loops, conditionals, and basic algorithms. Available in 20 languages.

## **This Month in History:**



### **52 Years Ago**

February 20, 1962: John Glenn became the first American to orbit Earth when NASA launched him into space aboard Friendship 7 on the Mercury-Atlas 6 mission. The purpose of the mission was to analyze the effects of space on the human body as Glenn completed three full orbits around the planet.

### **37 Years Ago**

February 18, 1977: Space Shuttle Enterprise completed its first flight test while attached to a Boeing 747 Shuttle Carrier Aircraft. The Enterprise is now on display at the National Air and Space Museum's Steven F. Udvar-Hazy Center in Chantilly,

Va.

### **32 Years Ago**

February 25, 1982: NASA launched the Westar IV, a communications satellite for Western Union, using a Delta 160 launch vehicle.

### **27 Years Ago**

February 5, 1987: The USSR launched the Soyuz TM-2 spacecraft, which connected to Russia's Mir Space Station. This mission marked the second expedition to Mir and lasted 174 days.

### **22 Years Ago**

February 23, 1992: NASA launched Navstar 2A-03 to establish the Global Positioning System (GPS), which is used by the military, industry and the general public for reliable navigation around the globe. The GPS uses 24 spacecraft: six satellites in each of the four orbit planes.

### **17 Years Ago**

February 11, 1997: NASA launched Space Shuttle Discovery to begin the STS-82 mission to service the Hubble Space Telescope for the second time. The crew members enhanced Hubble's capabilities by replacing two scientific instruments and upgrading other hardware. February 23, 1992: NASA launched Navstar 2A-03 to establish the Global Positioning System (GPS), which is used by the military, industry and the general public for reliable navigation around the globe. The GPS uses 24 spacecraft: six satellites in each of the four orbit planes.

### **12 Years Ago**

February 5, 2002: NASA launched the High Energy Solar Spectroscopic Imager (HESSI) solar flare observatory, which was later renamed the Reuven Ramaty HESSI. This spacecraft is used to study the behavior of solar flares, including their energy release and particle acceleration

## **Manufacturers**

Looking for a special rocket to blend a history and science lesson? Look no further...[Dr. Zooch](#) has a Friendship 7 Mercury Atlas rocket and a Vanguard Eagle two-stager for you! The Doctor also has a long list of other stand-off scale rockets you might find exciting as well!

Need a custom decal for your special classroom project? Check out [Excelsior Rocketry](#)...They have decal sets for older (classic) Estes, Centuri and Cox model rocket kits as well as kits of all types (scale, sport, futuristic, etc.).

Want something truly unique for your classroom rocketry demonstration? [Art Applewhite](#) has something for you...Check out his Cinco, Stealth, and Qubits kits! And don't be surprised to find something for free!

Ever wonder what happened to the Soviet's efforts to beat the US to the Moon? What did they have in mind for their big N-1 rocket? Take a look at ARA Press' new book, [N-1: For the Moon and Mars!](#)





## Quick Links...

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