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**National Association of Rocketry  
Educator's Newsletter**

**February 2013**  
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**In This Issue**

[2013 Team America Rocketry Challenge \(TARC\)](#)

[NAR Scholarship Program and Robert L. Cannon Award](#)

[American Institute of Aeronautics and Astronautics \(AIAA\) Foundation: Investing in the Future of Aerospace](#)

[Estes Educator Newsletter](#)

[Inspiring Others](#)

[This Month in History](#)

[Manufacturers](#)



**55 years of America in Space**

January of 1958 was a frantic time for the U.S. Army Ballistic Missile Agency. The Soviets had launched Sputnik in October and the Navy Vanguard rockets crafted to catch up with them weren't working. Since NASA didn't exist yet, the Army at Redstone Arsenal in Huntsville, Alabama was suddenly tasked with modifying a Redstone missile to carry a science satellite into orbit and getting America into the space race. On the last day of January, Explorer 1 blasted off to discover the Van Allen radiation belt around the Earth and began the process of our nation being the only country to land men on the moon. The challenge from the Soviets of being 'left behind' inspired America to commit itself to become the leader in space exploration. The lesson here for your students is no matter how you start you can finish as a big winner. We learn just as much from the history of rocketry as we do from the science and math of rocketry...Use it all!

Aim high!

Vince Huegele  
NAR Education Chairman



**2013 Team America Rocketry Challenge (TARC)**

Registration for TARC 2013 is complete; there are 725 teams fully registered. This is the most teams in TARC since the year of our founding, well above last year's 678. 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 11, 2013 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 25, 2013.

## **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 2013. 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 25 - Submit qualification form to AIA**

Apr. 9 - Top 100 team selected

May 15 - 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 the Joyce Guzik, via email: [jguzik@mindspring.com](mailto:jguzik@mindspring.com).**

### **American Institute of Aeronautics and Astronautics (AIAA) Foundation: Investing in the Future of Aerospace**

The AIAA is the professional society for the field of aerospace engineering. The AIAA Foundation has provided scholarships to over 500 college students at 130 universities. Additional information with deadlines is available at <http://www.aiaa.org/pdf/student/09ScholarshipFINAL.pdf>.



### **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 lesson plans from CAP...[http://www.capmembers.com/aerospace\\_education/](http://www.capmembers.com/aerospace_education/)

### **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! Check it out...(<http://www.scribd.com/collections/3819081/MODEL-ROCKETRY>)!

### **Estes Educator Newsletter**

Have you subscribed to the Estes Educator Newsletter? If not, sure are missing out on

some wonderful opportunities:

### **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. 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.

### **Great American Classroom Makeover**

Bring some life back into your classroom with the [Great American Classroom Makeover](#). Win up to \$10,000 to give your room a little effort! Plus, when you win--so does your school.

### **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](#).

### **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).

## **INSPIRING OTHERS:**

### **Kingsford High School, Michigan**

Last year students in the high powered rocketry program at Kingsford High School were shown a picture of an Adam Savage Bobble Head tied to a rocket and flown by their rivals the Myth Busters...They could not let the Myth Busters beat them by flying a rocket with a person tied to the outside of it. That began the quest to fly a life sized Adam Savage Bobble Head they called Buster's Revenge. You can see information on the project link:

<http://www.kingsford.org/khsWeb/rfs/tripoliuppermichigan/AdamBobblheadrocket.htm>

It took so many different prototypes to get the rocket to fly straight. They were constantly redesigning the rocket to stop it from flying with a curved path way. They found out how difficult it was to fly a rocket similar to the bobble head...it had to be much tall with a great amount of forward weight and with a motor of very high thrust.

The final rocket was a rebuild of a large rocket. It was 16 feet tall, 12 inches in diameter and weighed 180 LBS at lift off. The rocket flew in the Odd roc competition at LDRS in Potter New York on an N10,000 motor. The flight was perfect and really impressed the crowd! It was on the LDRS show on the Science Channel. Kari Byron loved the rocket and the interview was delayed at the pad as she took pictures of it . A picture was also posted on her twitter page wishing Adam Savage a happy birthday as the rocket was flown on his birthday.

<http://twitter.com/KariByron/status/224687884572172288/photo/1>

It is one more example of how rocketry can benefit high school students. The engineering to make it work took us a long time as things which our software told us were stable were not. It was a great experience. We plan on launching this rocket again at the Richard Bong Recreational Area in Wisconsin in March or April.

Our program was also a Cannon Award winner in 2005 and as a result of their rocketry experiences we see normally 60 to 70% of our students go into a science, math or engineering field when they enter college. Rocketry has done so much for our students

Bill Bertoldi  
NAR 81359  
WOOSH Member

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

NAR member Hans "Chris" Michielssen has developed and donated to the NAR some outstanding web pages of tutorial on "[How to Build a Rocket](#)" that go step-by-step through all the basic craftsmanship techniques of making a model rocket. This is a great complement to the 6-part NAR video on the AIA website on How to Build and Fly a Model Rocket. Thanks, Chris!

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

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.

<http://lawrencehallofscience.org/gems/GEMSpdf/teacher's%20handbook.pdf>

### **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.

### **This Month in History:**

**February 20, 1945:** The U.S. Secretary of War approved plans for the establishment of the White Sands Proving Ground in New Mexico. Later renamed the White Sands Missile Range, it was the site of pioneering research in rocket technology and the birthplace of the race to space in the late 1950s.

**February 9, 1950:** The U.S. Navy successfully launched a Martin Viking No. 3 rocket from White Sands Proving Grounds to an altitude of 50 miles, just out of Earth's atmosphere. Just over a week later a V-2 rocket reached an altitude of 92 miles. Both rockets represent significant achievements in rocket development and testing.

**February 3-11, 1995:** NASA launched space shuttle Discovery (STS-63) from Kennedy Space Center, Fla. This historic mission featured the first woman shuttle pilot, Eileen M. Collins. Highlights included the first flyby of the Russian Space Station, Mir, and the second flight of a Russian cosmonaut aboard a U.S. Space Shuttle. The mission lasted more than 8 days and landed at Kennedy Space Center on February 11.

**February 11-22, 2000:** NASA launched the Space Shuttle Endeavour (STS-99) from Kennedy Space Center, Fla. on a Shuttle Radar Topography Mission. The mission was an international project led by the National Imagery and Mapping Agency and NASA, and included the participation of the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt.). Its objective was to obtain the most complete high-resolution digital topographic database of Earth. A specially modified radar system gathered data that produced high quality 3-D images of 99.98 percent of Earth's surface. After a mission duration of 11 days, the shuttle landed at Kennedy Space Center, Fla. on February 22.

### **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!

Many teachers launch their students' rockets before bringing out one of theirs for the last launch -- and a lot of times their rocket is the Skywriter. And here's exciting news: the [No. 2 Estes Skywriter](#) has some competition! Recently Estes introduced a new series of [Ready to Fly](#) (RTF) rockets that look like crayons. Three colors are now available -- Pulsar Pink, Green Alien and Rocket Red -- with Planet Purple and Outer-space Orange coming in January 2013 and Blast-off Blue and Yellow Star arriving in April 2013. More colors are planned for later in 2013 that include black, gold, white and aqua.



## Quick Links...

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[Our Website](#)

[NAR Teacher Resources](#)

[Model Rocket Safety Code](#)

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