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# National Association of Rocketry Educator's Newsletter

August 2012

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## Curiosity on Earth

The robotic rover Curiosity has landed on Mars to begin a mission of surface exploration. Some of us thought we would have landed astronauts on Mars by now, but that event is still way in the future. Maybe we would have a manned expedition if we had more 'curiosity.' Has our culture lost interest in space exploration? If this generation has, the generation of your young students is still wide eyed about exploring everything. They still have a natural curiosity about the world around them that can be channeled into STEM. Have your class build and launch a rocket that carries a video camera and watch what they learn. We put Curiosity on Mars because we have curiosity here on Earth. Keep the curiosity going in your classroom with rocketry.

Always aim high!

Vince Huegele  
NAR Education Chairman



## Team America Rocketry Challenge (TARC) 2013

We have just announced the rules for the Team America Rocketry Challenge 2013 ([www.rocketcontest.org](http://www.rocketcontest.org)), the eleventh annual offering of this national rocketry competition for 7th through 12th grade students. The purpose of the Challenge is to teach students aerospace science and systems engineering by having them design and build a safe and stable model rocket that lifts a fragile payload to an exact altitude for a precise flight duration, at the end of which it must return this payload to earth safely and undamaged using a parachute as its recovery system. Team registration opens on September 4, and we will accept up to 1000 teams.

TARC competition leads to a competitive face-to-face fly-off among the top 100 teams. The prizes are \$60,000 in cash among the top 10 places. First place receives \$11,000 plus a free trip to the Paris Air Show for a flyoff against teams from the UK and France. The US fly-off is held at The Plains, VA, near Washington, DC in mid-May.

This year we are making the airframe have a fairly large minimum diameter and are making the duration portion of the challenge a little tougher to get a perfect score on by adding a constraint on parachute size (similar to TARC 2011) and narrowing the duration "window" from 3 seconds to 2 seconds while increasing the multiplier for missing this window from 3 to 4. We have also dropped the Perfectflite ALT15K as an approved altimeter since it has not been made for almost two years now.

Key technical elements of the TARC 2013 challenge are:

- \* One egg payload, and the egg must be flown and recovered "on its side" (installed in the rocket sideways)
- \* Body minimum diameter 60 millimeters (2.362 inches) at the point where the egg is located
- \* Altitude goal 750 feet
- \* Duration goal 48 to 50 seconds
- \* Liftoff mass limit 650 grams
- \* Rocket motor total impulse limit 80 Newton-seconds
- \* Recovery of egg and altimeter by parachute 15 inch diameter, +/- 1 inch
- \* Either of two altimeters permitted: Perfectflite APRA, or Pnut

Other elements of the challenge of interest:

- \* Finals date May 10-12
- \* 1000 team limit, no more than 5 per school
- \* Qualification flight deadline March 24 because March 31 (the normal 6 weeks before the Finals) is Easter

Trip Barber ([ahbarber@alum.mit.edu](mailto:ahbarber@alum.mit.edu))  
NAR 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. Three NAR members received scholarships and two educators received Cannon awards. Over the years the number of award winners have grown. This year we will award ten \$1000 scholarships, and ten Cannon \$500 grants.

At the NAR Association meeting Monday, July 30, the recipients of the NAR Cannon and Scholarship awards were announced.

### **2012 Scholarship Recipients are:**

- \* Blair Cutting, Virginia Beach, VA, attending Embry-Riddle U., Daytona Beach, FL, Mechanical Engineering
- \* Dylan Dickstein, Gold River, CA, attending Caly Poly San Luis Obispo, Civil Engineering
- \* Rachel Kaplow, Dundee, IL, attending U. Michigan, Theatre Design and Technology
- \* Ryan Kinsler, Kingman, KS, attending Hutchinson Community College, Diesel Mechanics and Ag Tech Management
- \* Katie Kosak,, Dandridge, TN , attending Florida Institute of Technology, Physics/Math
- \* Kirsten Ma, Seattle, WA, attending U. Washington Pre-engineering
- \* Shon Mack, Avondale AZ, attending Embry Riddle, Aerospace Engineering
- \* Eric Stallcup, Huntsville, AL, attending Mississippi State U., Aerospace Engineering
- \* Brian Smith, Ottawa, IL, attending Purdue U., Aerospace Engineering
- \* Harrison Yates, Charlottesville, VA, attending U. Notre Dame, Aerospace Engineering

### **2012 Robert L. Cannon Education Award Winners are:**

- \* Gary Brandt, Northwest Indian College, Bellingham, WA
- \* Kathryn Brent, Chagrin Falls Intermediate, Chagrin Falls, OH
- \* Allen Cox, Lincoln High School, Los Angeles, CA
- \* Rhonda Cox, Orion High School, Orion, IL

- \* Jeffrey Holmes, Wooddale High School, Memphis, TN
- \* Holly Erickson, STEM Center, West Fargo, ND
- \* Julie Kramer, Mother Lode Adventist Jr. Academy, Sonora, CA
- \* Jeffrey LaCosse, C.E. Jordan High School, Durham, NC
- \* Jim Sauer, Magdalena Public School, Magdalena, NM
- \* Mike Stanton/Robert Vasquez, Buena Park AFJROTC, Buena Park, CA

**The deadline for applying for the Scholarships and the Cannon Award in 2013 will June 1st.** Awards are announced at the annual meet (NARAM). You do not have to be present to receive an award.

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: [jguzik@mindspring.com](mailto:jguzik@mindspring.com).



### **Adventures in Rocket Science Educator Guide**

The "Adventures in Rocket Science Educator Guide" is available for download from the NASA website at [http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Adventures\\_in\\_Rocket\\_Science.html](http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Adventures_in_Rocket_Science.html).

Education specialists from the Marshall Space Flight Center created this curriculum with members of the NAR. The material was tested in a workshop pairing NAR members in the MSFC area with informal educators from science centers, 4-H clubs, Girl Scout troops and after-school programs to introduce the groups to how to use the guidebook with students in informal settings. The Guide has activities for grades K-12 and serves as a program to progressively prepare students for participating in TARC.

**NOTE:** The "Adventures in Rocket Science" guide is recommended over the NASA Educator Guide entitled simply "Rockets". Recently, an air pressurized paper rocket launcher being used by an educator accidentally failed. This launcher is described in NASA's Rockets Educator Guide, publications EG-2011-11-223-KSC, pp. 86-90 and EG-2008-05-060-KSC, pp. 86-90. NASA completed an engineering investigation into the failure and determined that the air pressure launcher should not be used. NASA has removed the launcher design from its website and its education curriculum. Individuals and organizations should immediately discontinue use of the air pressure launcher published in the referenced NASA publications.



**NAR Offers Teachers and Youth Group Leaders Resources**

Are you starting your rocketry program and aren't sure what rockets are right for your kids? Contact your **local NAR Section** (<http://www.nar.org/NARseclist.php>) to help with your program. Having worked with teachers, Section members can provide valuable advice about planning the time you have scheduled and purchasing rocket products tailored to your needs and launch site. For instance, did you know it takes a typical 8th grade class about two days to build a rocket with balsa fins? As you might expect, the age of your students and the size of your class are also factors in determining the right type of kit and the amount of time to complete it.

Indeed, based on the size of your launch site, a streamer recovery rocket (as opposed to a parachute recovery) might be a better option for your students as the chances for a successful return (and a chance for additional flights) would be greater.

In addition, The NAR offers Free Resource downloads (<http://www.nar.org/teacher.html>) produced by members who have helped teachers and youth group leaders like yourself all over the United States.

Of particular note is the NAR CD Version 3.0 update of the Education Resources CD-ROM. This disc is a library of classroom ideas, lesson plans, and rocket activities. It's been totally reformatted to be more convenient to find your most interesting topics with lots of new material. There are video clips, software samples, and internet links to the best sites in rocketry education. Most importantly, this disc is free from NAR for the asking, to you, our honored teachers.

Just go to <http://www.nar.org/teachercd.html>, answer a few questions about your class, give us your address and we'll mail it right to you.



### **NAR Education CD v3.0 Effectiveness Survey**

For those who have already received their NAR CD, how did it help? Was it useful to you and what material did you like?

As a consequence of your request to receive a CD (or received one at a NSTA convention), you are subscribed to this Newsletter. Please take a moment to complete our survey at [http://2020vertical.com/nar\\_edu\\_cd\\_dev/](http://2020vertical.com/nar_edu_cd_dev/). From the main menu (toward the bottom), click on "Using the CD" and select "Online Survey." There are ten quick questions that will let us know how well it worked and how to improve our products to serve you better.

Thanks for your feedback!



**Wallops Rocket Academy for Teachers and Students (WRATS)  
and RockOn! Programs**

**WRATS**

The second WRATS High School teacher workshop was held in the education lab in building F-7 at Wallops Flight Facility. Twenty-two educators from around the nation attended the workshop and spent June 18 - 22 learning about sounding rockets, model rockets, electronics, rocket physics and aerodynamics. The participants also attended the RockOn! Terrier Orion launch on June 21st.

Teachers built and flew model rockets and payloads measuring acceleration, temperature and pressure. Pre-flight testing of the rocket included measurement of Cg, stability and moments of inertia. The rockets were successfully flown on the Wallops airfield on June 21.

Additional activities during the week included an overview of windtunnels and several interactive presentations about rocket physics by SRPO chief Phil Eberspacher. Orbital Sciences provided the stipends giving the teachers the financial means to participate in the workshop.

## **RockOn!**

For the 5th consecutive year, the RockOn! student mission launched successfully from Wallops Island on June 21, 2012. About 80 college students and educators spent a week at NASA's Wallops Flight Facility building, testing and integrating their experiments to fly on a suborbital Terrier-Improved Orion sounding rocket.

The RockOn! workshop is arranged by the Colorado and Virginia Space Consortia and provides flight opportunities for Colleges and Universities. The mission was comprised of nine RockOn! workshop experiments and eight RockSat-C experiments. RockSat-C experiments are completely designed by the student teams while the RockOn! workshop experiments are built from kits created by the Colorado Space Grant. Attending the workshop is the first step toward more elaborate future experiments.

Working in groups of three or four, each RockOn! team receives an experiment kit consisting of an AVR microprocessor, various sensors, mounting hardware and programming software. Chris Koehler, Director of the Colorado Space Grant Consortium, is the instructor for the RockOn! workshop. By midweek all RockOn! teams completed their experiment construction, programming and integration. Their experiments were installed in the payload structure and transported to Wallops Island for mating with the rocket motors. The launch window opened at 6 a.m. on June 21st and the countdown started a few hours before that. The launch of the 2012 payload occurred at approximately 06:40 a.m.

At T -0 the Terrier booster ignited and some very happy experimenters cheered it on as it lifted their instruments toward space. The Terrier burns out after about five seconds, and the Orion sustainer takes over after a short coast phase. The rocket carried the experiments to an altitude of 73 miles. On the downleg a parachute deployed to soften the impact of the payload. The payload is sealed and remains floating in the water until it is picked up by the recovery boat. Once the payload is back at Wallops Flight Facility the experiments are returned to the students and postflight checks and data analysis can begin.

For more information about RockOn! and RockSat, please visit:  
<http://spacegrant.colorado.edu/rockon>



## Space History

**August 12, 1960:** NASA launched its first communications satellite, Echo 1. Echo 1 rode to space on a Thor-Delta rocket from Vandenberg Air Force base, California. The satellite transmitted a signal from President Dwight D. Eisenhower across the nation, demonstrating the feasibility of global communications via satellites. Echo 1 was the largest and most visible satellite for its time; however, it was quickly superseded by active-repeater communication satellites such as Telstar.

**August 21-29, 1965:** NASA launched Gemini V on a Titan II rocket. Several records were set during this eight day orbital flight: the longest manned flight; largest amount of time in space; and a new altitude record for an American spacecraft. Astronaut Gordon Cooper was the first man to make a second orbital flight and, consequently, accumulated a record amount of spaceflight for one individual.

## Manufacturers News

There is great information for teachers provided by these rocket companies.

Estes has an internationally recognized curriculum for educators at <http://www2.estesrockets.com/cgi-bin/WEDU100P.pgm>. Additionally, they offer a newsletter <http://www2.estesrockets.com/cgi-bin/wedu001P.pgm?p=newsletter>. If you're interested in their new products (like the V-2) take a peek at <http://www.estesrockets.com/new/>.

Quest Aerospace has a great resource center for educators! You can sign for special discounts and information at [http://www.questaerospace.com/q\\_rcentral.asp](http://www.questaerospace.com/q_rcentral.asp). Be sure to take a look at all their multimedia and graphics section for some inspiring ideas!

Apogee Components has an extensive educator's page and a remarkable newsletter archive <http://www.apogeerockets.com/Education>. If you want to subscribe to their newsletter try [http://www.apogeerockets.com/newsletter\\_signup.asp](http://www.apogeerockets.com/newsletter_signup.asp) or just look at the right hand column of the Educator's page and you will see the sign-up section.



## Quick Links...

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- [Our Website](#)
- [NAR Teacher Resources](#)
- [Find a Local Club](#)
- [Model Rocket Safety Code](#)

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*Try it FREE today.*

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