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National Association of Rocketry Educator's Newsletter

February 2015

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In This Issue

Rocket Night at the Museum

In the last issue, I ran a teaser about our new rocket teacher training program called narTcert. Now we're running the 'trailer' below to further explain how it will work before it is finally released. Why the hype? We want to launch this new enterprise with a bang and attract a lot of participation. And we are amplifying it by having the narTcert program opening coincide with the dedication of the first ever NAR Model Rocket Exhibit opening at the Museum of Flight in Seattle, February 21, 2015. Both events are really big deals in the world of science education. The NAR exhibits shows how model rocketry developed, how a rocket works and how sport rocketry serves America. NarTcert is what you do after you see the exhibit; you learn to fly rockets for yourself and for your students. February is going to be momentous!

Aim High!

Vince Huegele
NAR Education Chairman

Introducing narTcert for Educators

What is narTcert?

The NAR Education Committee is proud to announce the NAR Rocket Teacher Certification Program or 'narTcert.' This is a program to train teachers through the web to have the skills to build and fly model rockets and the confidence to lead a rocketry lesson in the classroom. A teacher will build and launch a simple model with a NAR member or section and receive formal recognition to be a 'model rocket science teacher.' NAR has been training teachers for decades; this program is a standardization of the learning process to help teachers and rocketeers work together.

Why be in narTcert?

NAR certified teachers are recognized as having been trained by NAR to be knowledgeable and qualified persons to conduct launches, organize rocket programs with hands on STEM lessons for their school, and support TARC (Team America Rocketry Challenge). Besides being a functional skill, the certification will formally add to the teachers' professional career development credentials. Teachers can also be granted continuing education units by contacting their local school systems.

Who can apply to narTcert?

NAR will "narTcert" any NAR member who is a professional classroom teacher with or without a science/math background, an educator teaching an after school program, a home school teacher or an informal educator with a youth organization. The applicant would be anyone who will 'teach or train using model rocketry.' The educator can be a total beginner rocketeer or an experienced flyer, but both have to go through the certification process.

How do you do the narTcert?

In narTcert you will learn all about model rocketry through our training site. This will tell you how to build and fly a rocket and how to use it in a STEM lesson. You'll create a lesson plan and send it to NAR. You will make contact with a local NAR member mentor who will give you a simple written test and watch you launch your rocket. After your successful launch you will receive your certification.

When does narTcert begin?

The narTcert program will be launched and formally opened at NARCON in late February. The narTcert pages will be listed on the nar.org website menu then and in the next issue of this educator's newsletter. Then you can visit the site to register and start your training. We hope narTcert will be as revolutionary to the growth of STEM education as TARC has been. Your support of this new program in your community will make it so.

Come see it all at NARCON in Seattle WA on 20-22 February!!!

2015 Team America Rocketry Challenge (TARC)

Registration for TARC 2015 is complete! 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 9, 2015 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 30, 2015.

Outreach Contest

This is another reminder of this year's TARC Outreach Program. A 101st spot at the National Finals will be awarded to a team that submits qualifying scores of at least two valid launches but would otherwise not make the cutoff for the National Finals. The

criteria and other details are here.

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.

We are currently tracking teams versus their mentor status as indicated on their registration. If you have since found a mentor, or no longer have a mentor and are looking for one, please either update the TARC portal or send an email to miles.lifson@aia-aerospace.org.

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 2015. 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.

TARC Stars

Have alumni from your TARC program gone on to careers in aerospace or to do other cool things? We want to know! We are reviving the TARC Stars program to recognize outstanding TARC alumni. Advisors, simply fill out the information requested here for your chance to win a gift card to help buy rocketry supplies for your teams.

Vendors

Most teams should now be in the design and build phase. A list of TARC Supporting Vendors is available at http://www.rocketcontest.org/vendors.cfm. Each has agreed to provide TARC specific discounts (the TARC handbook explains how to get the discount). As you decide upon and purchase your parts, take a look at their offerings to see if you

can save your team some money.

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 30 - Submit qualification form to AIA
Apr. 3 - Top 100 team selected
May 9 - National Finals at Great Meadow in The Plains, VA

The NAR website provides additional information. There is a superb new teacher resource posted on the TARC website.

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:** jguzik@mindspring.com.

INSPIRING OTHERS:

Department of Defense's STARBASE Program

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 engages students through the inquiry-based curriculum with its "hands-on, mind-on" experiential activities. They study Newton's Laws and

Bernoulli's principle; explore nanotechnology, navigation and mapping. They are captivated by engineering as they use the computer to design space stations, all-terrain vehicles, and submersibles. Math is embedded throughout the curriculum and students use metric measurement, estimation, calculation geometry and data analysis to solve questions. Teamwork is stressed as they work together to explore, explain, elaborate and evaluate concepts.

The military volunteers apply abstract principles to real world situations by leading tours and giving lectures on the use of STEM in different settings and careers. Since the academies are located in different branches of the military this experience is highly varied. Students may discuss how chemical fires are extinguished, learn how injured are transported, explore the cockpit of an F-18 or the interior of a submarine.

The academies work with school districts to support their standards of learning objectives. A teacher whose class attended DoD STARBASE stated, "STARBASE teaches science and math in ways that we wish we had the time, resources and expertise to do in the regular classroom. It's experiential, exploratory learning with a direct tie to the standards." Find the STARBASE near you!

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

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.

Wallops Rocket Academy for Teachers and Students (WRATS)

In June of this year, the WRATS teacher work shop will be held for the 5th time at Wallops Flight Facility. Teachers from near and far will attend the week long educational experience.

WRATS combines hands-on activities such as building model rockets, parachutes and an electronic payload with theory on rocket propulsion, flight dynamics, and trajectory simulations.

Each teacher builds a model rocket and a payload and designs a recovery system during the week. Flight data is recorded on-board and analyzed post flight. The payload incorporates an Arduino Micro and three sensors; an accelerometer, a pressure transducer and a thermistor. All payload recorded data and analysis should show that the rockets reached altitudes of between 400 - 600 feet.

Phil Eberspeaker/Chief Sounding Rocket Program Office will be the main presenter and provide the teachers with interactive demonstrations as well as theory of

rocket flight. Educators will learn about various types of rocket propulsion, forces of flight, rocket stability and recovery system shock absorption.

The WRATS teachers will attend the early morning launch of RockOn! and view the payload de-integration and experiment return.

RESOURCES

Civil Air Patrol

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 DonorsChoose Organization

The NEA Foundation funds and supports educator-driven solutions to improve student performance. Through our work, we've learned that the best teaching ideas come from our greatest assets, educators. Teachers have great ideas to help their students learn more, but often lack the resources they need to bring these ideas to life. Last year, through our partnership with DonorsChoose.org, we matched public donations to support 1,500 NEA member requests for classroom materials, reaching 120,000 public school students. This year, with your help, we hope to reach even more. Check it out!

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.

For more information, visit microgravityuniversity.jsc.nasa.gov/tfs or send an email to jsc-rgeducator@nasa.gov.

6,117,549 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:

53 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.

38 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.

33 Years Ago

February 25, 1982: NASA launched the Westar IV, a communications satellite for

Western Union, using a Delta 160 launch vehicle.

28 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.

23 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.

18 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.

13 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 decals 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*!

Just can't decide what to get? Take a look at all the options eRockets has to offer! ***In addition, eRockets is now the new owner of SEMROC!!***

Quick Links...

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Our Website
NAR Teacher Resources
Model Rocket Safety Code

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