



# National Association of Rocketry Educator's Newsletter

June 2015

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## Sweet Home Victory

I was proud of the winning TARC team this year, Russellville City School, as it was the first school from my own home state of Alabama to come in first. I was particularly proud because I helped time the qualification flights that got them into the finals. My stopwatch hasn't been reset yet; consequently, it still has their winning number on the display. I helped several other teams fly and they also did well; but, they did not get to the top one hundred best scores. As educators we teach all groups and hope some of them will achieve great heights. And when they do, we share their triumph. You never know what they will learn or what they will do, so you are patient with everyone to encourage their performance. Now the Russellville, Alabama team is the national champions and will be going to Paris for the international competition. It wouldn't have happened without TARC. The same success story could happen in your group for 2016...You just have to aim high.

Aim high!  
Vince Huegele  
NAR Education Chairman



## 2015 Team America Rocketry Challenge (TARC)

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.

TARC 2015 is completed and the winners have been named. Congratulations to Russellville City School from Russellville, Alabama for finishing in first place at the TARC 2015 Finals on May 9. This was the first year a team from their school made it to the Finals. In addition to their cash prize of \$20,000 (plus \$1,000 for their school), the team will be traveling to Paris in June as the guests of the Raytheon Company to fly against the winners of the TARC-equivalent event in the UK and France at the Paris Air Show, the biggest aerospace show and exhibition in the world in 2015. Another big thank-you to Chris Kidwell who has done all results management since the beginning of TARC, and who gets me the digital results within hours of the end of the Finals.

Congratulations as well to the other top 10 teams who shared the rest of the \$100,000 overall cash prize pool (up from the \$60,000 prize pool in previous years) and to the winners of the \$4,500 awarded in the various special awards, and to all the teams who flew well enough in local qualification flights to come to the TARC 2015 Finals. Any TARC team making it to the Finals represented a highly successful combined effort of students, teachers, parents, and NAR mentors (you) that can be proud of their achievements. Any team completing a TARC 2015 qualification flight met all the educational and NAR outreach goals of the TARC program, even if they did not come to the Finals.

695 teams (representing over 5000 students) entered TARC 2015 from 48 states, 459 teams made at least one qualification flight attempt (66%, a record high percentage and a tribute to your local work as mentors), and the 101 teams at the Finals represented 28 states plus the US Virgin Islands. AIA at the national media level, and our NAR volunteers at the local media and word-of-mouth level, are doing a great job recruiting for TARC. I have attached a [TARC publicity handout](#) for your use in continuing this recruiting for TARC 2016.

We had pretty good weather this year at the Finals and as a result were able to get in two rounds of second flights (42 total) for the first time. The ability to handle so many flights from check-in through launch and recovery so smoothly, fast, and safely - all with a smile -- was a great demonstration of teamwork and NAR spirit, and I thank all of the NAR team making up this range crew for making this happen. We delivered exactly what we promised to some of the best young people in America. When we offer a national program that offers hands-on mentoring at the local level by expert volunteers (that's you, our NAR TARC Mentors) and culminates with a highly-organized, professionally-run Finals event (thanks to the 100 of you who were the NAR range crew that made this happen), we can truly make a difference, and we are. Thank you for what each of you contributed to TARC 2015 as a mentor. This is "paying forward" on a scale that would have made Harry Stine proud, and in a way perfectly aligned with one of the most important missions of the NAR -- educational outreach.

This year we released [the rules for the next year's TARC challenge](#) at the end of the awards ceremony. Key elements of the challenge are:

- Payload is two eggs (one oriented lengthways, one sideways - an interesting egg-protection challenge, particularly in combination with the higher descent rate)
- Altitude goal is 850 feet, duration goal is 44-46 seconds for all qualification flights and for the first flight at the Finals; but at the Finals (only) those teams that earn a second flight must aim for a different goal on the second flight: 825 feet and 43-45 seconds
- Weight, length, and power limits are the same and we added one altimeter, the new Perfectflite Firefly, to the Pnut and APRA
- The rocket must return with all parts connected together; no specific requirement

is stated for what recovery system may be used (as long as recovery is safe and autonomous), so anything goes; this could get interesting

- No limit on the number of teams that a school or youth group organization may enter, but only the three best-scoring teams whose members are from any single organization/school will be eligible to be invited to the Finals. Team supervisors can adjust membership of these three teams before the Finals (within the maximum limit of ten per team) to include students from other teams from their school that scored better than the national Finals cutoff score but were not in the top three from that school.
- Selection for the Finals will continue to be based on the sum of the best two of up to three qualification flight reports submitted by a team by April 4; no bonus point award for doing one early.

Thank you for what you did to build the future of America's aerospace workforce and of the NAR through your service as a Team America Rocketry Challenge mentor! I look forward to continuing our success with your help in TARC 2016.

### [Trip Barber](#)

NAR 4322 L3

NAR TARC Manager



### **National UK Rocketry Challenge Opens**

Secondary school children from across the UK are invited to enter the UK Aerospace Youth Rocketry Challenge (UKAYRoC), with the top team taking their rocket to the Paris Airshow in June where they will compete in an international Fly-Off.

Designed to encourage teamwork, creativity and innovation, The Rocketry Challenge involves teams of up to ten creating a rocket using a basic kit. Finished rockets need to be more than 65 centimetres in length; motor-powered and capable of taking off and landing with a raw egg on board that remains intact. The winning rocket will be the one that travels highest and for the longest time.

Organised by UK trade organisation for space and aerospace industries, ADS Group, the competition is now in its ninth year. This year's event is sponsored by Lockheed Martin UK and UTC Aerospace.

Paul Everitt, Chief Executive of ADS Group said: "The UK space and aerospace industries are world leaders and there are great career opportunities for young people with strong maths and science qualifications.

"The UK Aerospace Youth Rocketry Challenge is a great way to engage the next generation of engineers and give them practical experience of building and executing complex missions. This is an exciting way to learn more about maths and science with the UK winners getting the chance to compete against teams from France and the US at this year's Paris Airshow."

Stephen Ball, Chief Executive of Lockheed Martin UK said: "Lockheed Martin is building Orion, NASA's deep space exploration capsule that took its first steps towards Mars with a successful test flight last year and we want to find the next generation of scientists and engineers who can help us to design the spacecraft of the future. The UK Aerospace Youth Rocketry Challenge is a great event to inspire young people about space and encourage them to consider careers involving science, technology, engineering or maths."

While the maximum size of a team is ten, teams of four to five members is

recommended, and there is no limit to the number of teams that can be entered. There were more than 90 applications in last year's challenge, with the winning team competing at the Farnborough International Airshow against finalists from the US, France and Japan.

Competitors can either self-qualify for the national final or attend a qualification day on 20 May. The top twenty teams will be invited to take part in the National Final in Essex on 2 and 3 June with the finalists invited on an all-expenses-paid trip to Paris for the international Fly-Off on the 18 - 19 June.



### **NAR Scholarship, Robert L. Cannon, and NAR Extracurricular Activity Grant Awards**

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. Currently, we award 10 \$2000 NAR scholarships and 10 \$500 Cannon winners per year.

In 2015, a new program, the NAR Extracurricular Activity Grant (EAG) is being initiated to provide up to ten \$500 grants for after-school activities, such as rocket clubs, scout, Civil Air Patrol, 4-H, or NAR section programs involving model rocketry. TARC teams are not eligible for these awards.

**While the deadline for 2015 NAR scholarship, Robert L. Cannon, and the NAR Extracurricular Activity Grant has just expired, you can start planning for 2016. The deadline for these awards in 2016 will be June 1st.** Awards are announced at the annual meet (NARAM). You do not need to be present to receive an award.

All of these programs are ongoing. See <http://www.nar.org/educational-resources/nar-scholarship-program-and-robert-l-cannon-award/> 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).

### **Interested in a Fellowship this Summer?**

Industry Initiatives for Science and Math Education (IISME), founded in 1985, seeks to transform teaching and learning through industry-education partnerships. IISME exists to address the critical need for a strong, highly skilled workforce in math, science and technological fields. IISME recruits sponsors in California from Alameda, Contra Costa, Marin, Sacramento, San Francisco, San Mateo, Santa Clara, and Santa Cruz Counties. The majority of Fellowships are offered in the Palo Alto, Sunnyvale, Santa Clara and San Jose Area.

This industry-education partnership focuses on teachers as the primary agents for effecting meaningful change in mathematics and science education. IISME provides teachers with experiences and tools they need to adapt their practices and change their

schools so that all students are prepared to be lifelong learners, responsible citizens and productive employees. <http://www.iisme.org/>



### **Air Force Association Educator Grants**

The Air Force Association believes that one of the most significant means to affect student learning is to fund grants to meet the unmet and unfunded educational needs of students. Each school year, the Association awards [grants of up to \\$250](#) to worthy projects that significantly influence student learning.

View [Grant Guidelines](#) and Official [Grant Rules](#).

To apply: [Register](#) (Be sure to write down your username and password)  
Returning participants: [Log-in](#) (Using your existing username and password)  
Grant applications must be completed and submitted online - hardcopy or faxed applications will not be considered.

Important Dates for the 2015 Educator Grant:

July 1, 2015 - grant submission period opens  
November 18, 2015 - grant submission period closes  
February 2016 - grant winners are announced

The grant process is competitive in nature. A committee comprised of outside experts in the field of aerospace education will review all qualified grant applications and make recommendations on funding. Based upon the funding available, the Association will choose to invest in projects that best serve our nation's students and support the mission of the Air Force Association.

The Educator Grant program promotes aerospace education activities in classrooms from kindergarten through twelfth grades. The program encourages development of innovative aerospace activities within the prescribed curriculum. Questions regarding the Educator Grant program should be directed to the program manager via e-mail at [field@afa.org](mailto:field@afa.org).

### **INSPIRING OTHERS**

#### **The North Carolina School of Science and Mathematics**

The North Carolina School of Science and Math Summer [Accelerator Program](#) extends to a global audience our 30 years of experience offering innovative courses and opportunities to talented high school students.

The Accelerator program offers unique, high-level courses in an innovative format that incorporates both residential, hands-on learning and online education. This summer, explore aerospace engineering by designing and launching your own rocket. Analyze the connection between music and math and compose your own work in Music of the World and the Math Behind It. Uncover the secrets of the dead and real-world excavation methodology in Death and Burial Around the World.

Highly skilled faculty focus their talents on building upon the strengths of high-achieving students in advanced science and math topics in the classroom. Student Life Instructors offer a valuable resource and help provide a safe and enjoyable residential experience for students out of the classroom. NCSSM crafts unique college-level academic experiences, as a constituent and flagship high school of the University of North Carolina system, in a setting designed specifically for high



school students.

Explore complex topics, collaborate with peers from around the globe, and get hands-on experience that will kick start college readiness and career interests this summer.

### **Innovation Now**

How about a daily 90 second radio program that features highlights in aeronautics and aeronautics technology, science, history, innovations, research, and inventions from the aerospace industry? Try this one out! [www.innovationnow.us](http://www.innovationnow.us)



### **Civil Air Patrol**

Collectively, we can have a remarkable impact on a partnering national organization. Take the time to contact a [local Civil Air Patrol squadron](#) near you and Pay Forward! You can find a local squadron by entering your zip code or city and state in the online unit locator found on the [home page](#). Each of these squadrons would welcome your insights and camaraderie! Additionally, the Civil Air Patrol has an Advanced Rocketry Program (and Guide) for those folks who enjoy High Power Rocketry as well as Mid and Low Power...It's a great opportunity to share experiences and Pay Forward!



### **4-H**

### **National Youth Summit Series**

The National Youth Summit Series brings together some of the best and brightest students to focus on [maker, healthy living, and agri-science](#). Designed for high school students (grades 9 - 12), the Summits provide opportunities to learn technical skills, participate in hands-on activities and workshops, learn from leaders in the field, and visit professional and academic sites. Students attend in teams comprised of two to eight youth and are accompanied by an adult mentor/chaperon.

### **Rocketry School Enrichment and After School Enrichment Program**

help students meet Pennsylvania Academic Standards in science. 4-H project books are available for [Delaware County, Pennsylvania](#) classroom teachers, home school families, and after school clubs to use with students.

### **Estes**

### **Student STEM Competition Offers \$100,000 Awards**

The Siemens Foundation has opened its annual [Competition in Math, Science & Technology](#), with this year's program offering scholarships ranging from \$1,000 to \$100,000. Administered by the [College Board](#), the competition calls on high school students to submit original research in technology, science, or math, either as individuals or in teams. Regional competitions will be held at six United States universities in November, with finalists competing in Washington, DC, in December.

The application period for the awards is open now. Applications are due Sept. 30. Additional details can be found on the [Siemens Competition in Math, Science & Technology site](#).

### **Promote STEM with Reach For The Stars - National Rocket Competition**

There is still time to get your kids into the Reach for the Stars - National Rocket Competition. The deadline for entering is August 31st, which gives museums, schools, scouts and youth groups enough time to get their supplies and run a local

event. This year's Competition was kicked off by famed author Homer Hickam in Coalwood, West Virginia at the October Sky Festival - with the original "Rocket Boys" giving the countdown.

Special pricing makes the Competition very affordable. In most cases the cost of the rocket kit, supplies for two launches, achievement certificate and Competition registration is less than the list price of the rocket kit alone. A step-by-step video and on-line help, supplied free with order, are available to guide you. The Competition is for ages 10 to adult, with three levels determined by age. Time and supplies are limited, so get started now! More information is at [TheRocketman.net](http://TheRocketman.net).

### **The National Aerospace Training and Research (NASTAR) Center**

Located about 50 minutes by car from the city of Philadelphia, NASTAR is offering teacher development programs at **no cost to teachers** through its non-profit NASTAR Foundation. [NASTAR's teacher programming](#) emphasis is on fun, experience-based learning that provides teachers with practical tools and activities that they can apply in a classroom environment. Teachers can experience a 3-G suborbital spaceflight simulation in the NASTAR Center centrifuge, ascend to 8,000 feet in the altitude chamber, or learn how airplanes are controlled while piloting the GAT II simulator. The NASTAR Center has added two new teacher professional development programs: "The Atmosphere and Weather" and "Exploring the Solar System" for this summer.

The NASTAR Center is an approved provider of Act 48 continuing education hours by the Pennsylvania Department of Education. Each program is worth 8 hours of continuing education.

Programs are offered at **no cost to teachers**. If you are coming from out of town, they have arranged a meal/room package at a special rate at an area hotel. For enrollment information, contact Greg Kennedy at (215) 355-9100, X 1512, or via email at [gkennedy@nastarcenter.com](mailto:gkennedy@nastarcenter.com). A program list and registration packet may also be downloaded from the NASTAR Center website, [nastarcenter.com](http://nastarcenter.com).



### **Rocket Science 101**

[Here is a website](#) where you can learn about the basic parts of a real launch vehicle, how they are configured, and how they work together to launch a NASA spacecraft. Rocketry Science 101 would be great for students who want to build a virtual rocket.

### **National Coalition for Aviation and Space Education (NCASE)**

**Embry-Riddle Aeronautical University** is partnering with the Aerospace States Association in support of the [Real World Design Challenge](#) (RWDC), an annual high school competition aimed at increasing the science, technology, engineering and mathematics (STEM) workforce.

Embry-Riddle will award up to seven \$50,000 scholarships - \$12,500 annually per student - to winners of the national competition who attend the university, and its professors will serve as mentors to high school teams and as judges in future national-level challenges.

The agreement, starting with the competition in 2014, expands Embry-Riddle's continuing efforts to encourage young people to pursue technical careers.

Embry-Riddle is the only university formal partner in the competition in which teams of high school students and their teachers try to solve an engineering challenge faced by industry, one in aviation and one in ground transportation.

Students first compete in a state-level Governor's Cup and then each state's best team competes in the national finals in Washington DC.

"Through this partnership we plan on making the Real World Design Challenge opportunity available to all secondary students in the United States. Embry-Riddle is critical in helping us achieve this goal," said Ralph K. Coppola, founder of Real World Design Challenge and president of RKC International. "Embry-Riddle's expertise in aviation will better help us prepare students for careers in this critical area."

"Having been a national blue ribbon judge since the first Real World Design Challenge, I know that these students are awesome. With guidance from teachers and mentors, they take an actual design issue from concept to an engineering solution," said Bob Mansfield, executive director of the Center for Aviation and Aerospace Leadership at Embry-Riddle. "This sponsorship gives hundreds of high school students who want to be in the aerospace industry a chance to participate in the RWDC, learn about our exceptional university and have access to our faculty as mentors."

## RESOURCES



### **NASA Makes Finding Teaching Materials Easy**

NASA's Education Materials Finder will help you locate resources that can be used in the classroom. Users may search by keywords, grade level, product type and subject. With hundreds of publications and Web sites indexed, the finder is a great way to [locate NASA educational resources](#).

### **Rocketry School Supplies Provided by Donors**

As teachers, you know your students' needs best. [Donorschoose.org](http://Donorschoose.org) is available to provide an avenue for public school teachers to submit project requests for the specific materials their students need to learn.

As their name implies, donors choose which projects to support. Once a project is funded, they deliver the materials directly to the school.

In return, teachers submit photos of the project in use and thank-you notes from students, which are then sent to the project's donors.



### **National Association of Rocketry (NAR) Offers Teachers and Youth Group Leaders Resources**

[Free resource downloads](#) produced by members who have helped teachers and youth group leaders like yourself all over the United States.

## Space History



**Fifty years ago** this month, Astronaut Edward H. White II became the first American to perform what in NASA parlance is referred to as an Extra Vehicular Activity (EVA). In everyday terms; a space walk.

White, Mission Commander James A. McDivitt and their Gemini IV spacecraft were launched into low Earth orbit by a two-stage Titan II launch vehicle from LC-19 at Cape Canaveral Air Force Station, Florida. The mission clock started at 15:15:59 UTC on Thursday, 03



June 1965.

On the third orbit, less than five hours after launch, White opened the Gemini IV starboard hatch. He stood in his seat and mounted a camera to capture his historic space stroll. He then cast-off from Gemini IV and became a human satellite.

White was tethered to Gemini IV via a 15-foot umbilical that provided oxygen and communications to his EVA suit. A gold-plated visor on his helmet protected his eyes from the searing glare of the sun. The space-walking astronaut was also outfitted with a hand-held maneuvering unit that used compressed oxygen to power its small thrusters. And, like any good tourist, he also took along a camera.

Ed White had the time of his all-too-brief life in the 22 minutes that he walked in space. The sight of the earth, the spacecraft, the sun, the vastness of space, the freedom of movement all combined to make him exclaim at one point, "I feel like a million dollars!".

Presently, it was time to get back into the spacecraft. But, couldn't he just stay outside a little longer? NASA Mission Control and Commander McDivitt were firm. It was time to get back in; now! He grudgingly complied with the request/order, plaintively saying: "It's the saddest moment of my life!"

As Ed White got back into his seat, he and McDivitt struggled to lock the starboard hatch. Both men were exhausted, but ebullient as they mused about the successful completion of America's first space walk.

Gemini IV would eventually orbit the Earth 62 times before splashing-down in the Atlantic Ocean at 17:12:11 GMT on Sunday, 07 June 1965. The 4-day mission was another milestone in America's quest for the moon.

The mission was over and yet Ed White was still a little tired. But then, that was really quite easy to understand. In the time that he was working outside the spacecraft, Gemini IV had traveled almost a third of the way around the Earth.

Now, that's a long walk!

## Manufacturers

Looking for a large scale rocket to display in the classroom or a mid/high power highlight for your demonstration launches? Check out [Lower Hudson Valley's](#) collection or the [Ultimate Paper Rocket Guide](#) site. How about something in 1/12...Check out Mike Bauer's selection of Stomp Rockets at [Alaska Paper Model Rockets](#) or drop him an email at [paperstomprockets@yahoo.com](mailto:paperstomprockets@yahoo.com). These make fantastic displays or compressed air powered rockets! Looking for something smaller? Need a more traditional building project? Cast your glance toward [Fliskit's](#) large assortment of MicroMaxx kits...From scale, futuristic, to oddroc, you won't be disappointed. Need something in between these sizes? Try [Rocketarium's](#) unique line of scale, futuristic, and oddroc kits!



## Quick Links...

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

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