



National Association of Rocketry Educator's Newsletter

April 2015

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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.

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 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. Get started today at [Get started today!](#)

We're BACK

After an absence of two years, NAR and TARC were at the NSTA Conference in Chicago this year from March 12-15. The AIA and local rocketeers greeted visitors and talked about using rockets to teach STEM and develop the aerospace workforce. If you were there it was nice to see you and we welcome many of you who are new subscribers to this newsletter.

4-H Rocket in Museum of Flight

On February 21, 2015 in Seattle WA, the NAR Board of Trustees dedicated the new model rocketry exhibit (featuring the Estes and Stine collections) at the Museum of Flight. This is the first permanent exhibit exclusively devoted to model rocketry in an American museum. Among the historical artifacts (one is a model rocket taken into space aboard the shuttle) are some models that won awards in national and international contests. Specifically, the rocket that won TARC and the world championship in 2013...It was flown by the Georgetown Texas 4-H group ([See photos here](#))...The green and white rocket is still claiming fame in a glass case between a Space Shuttle trainer and a Hubble space telescope model. Let's try to find ways to continue getting 4-H groups into NAR rocketry...The results can be impressive!!

To help sustain the momentum, the NAR would like you to send us the website url's of your current 4-H rocketry activity so we can show everyone what your group is doing. The listing should be a single line description with the appropriate url, as in "Kenosha Co WI 4-H announces 2015 rocket meeting dates" - <http://www.nar.org/educational-resources/4-h-partnership/>. Send these links to vinson.huegele@nar.org and I'll put them on the NAR 4-H page.

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.

Structured to emulate the aerospace industry's engineering design process, TARC challenges teams to design and build a model rocket (650 grams or less in weight, 650 millimeters or more in length using NAR-certified model rocket motors totaling 80 N-sec or less of total impulse) capable of carrying a payload of one Grade A Large egg for a flight duration of 46-48 seconds to an altitude of exactly 800 feet (measured by an onboard altimeter) and then return the egg to earth uncracked using a parachute as a recovery device. To encourage ingenuity and creativity, students are challenged with new design and flight requirements each year.

AIA has just notified the [top 100 teams](#) of the registered teams competing in TARC 2015 of their status and invited them to attend the TARC Finals on May 9, 2015 at Great Meadow, The Plains, VA. Selection was based on the best qualification flight score reports submitted by teams by the deadline of March 30, 2015.

The TARC outreach program offers a 101st spot at the National Finals for a team that

did not make the Finals score cutoff but did the best job at spreading the word about TARC to their peers and community. There are lots of outreach resources on the NAR website "[Teachers and Youth Group Leaders](#)" page and on the other resource web pages listed in the [Handbook](#) provided to all the TARC teams.

Congratulations to the Finalists, and to all the teams who achieved a successful qualification flight. Building a complex rocket with an egg as its payload and making it fly correctly is not easy, and any team achieving this result was fully successful in meeting the educational goals of TARC. The challenge goal for TARC 2016 will be announced at the TARC 2015 Finals. Registration for TARC 2016 will open in September 2015.

[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 awards have grown. This year we will award ten \$2000 scholarships and ten Cannon \$500 grants.

The **deadline for applying for a scholarship or a Cannon award is June 1st of each year.** 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.

Interested in a Fellowship this Summer?

The IISME [Summer Fellowship](#) Program places [eligible](#) K-16 teachers of all subjects into high-performance work sites for the summer. Teachers work full-time for eight weeks, complete a project for their Fellowship Hosts, and are paid \$8,200 for their work. Teachers also spend 10% of their paid time focusing on how they will transfer their Summer Fellowship experience back to their students and colleagues.

Sacknoff Prize for Space History

To encourage research and writing in space history, *Quest: The History of Spaceflight* is offering \$300 and a publishing opportunity to our upper-class undergraduate or graduate level students. If you are writing a paper on any aspect of spaceflight history, considering submitting it to Dr. David Arnold at quest@spacebusiness.com. Check out the details here--[Space History](#).

INSPIRING OTHERS



Cool Link: Rocket Science 101

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. Great for students who want to build a virtual rocket.

National Coalition for Aviation and Space Education

AIAA Foundation Educator Achievement Award

Do you know a deserving K-12 Classroom teacher that deserves to be recognized? Honor a K-12 classroom teacher for the work they do to support the American Institute of Aeronautics and Astronautics (AIAA) in its efforts to bring "real world" STEM (Science, Technology, Engineering, and Math) to the classroom in new and exciting ways. Nominate teachers who excite and engage students through STEM content and experiences. Through this recognition, AIAA celebrates the "best and brightest" educators for inspiring students. Each award recipient will be honored at the AIAA Aerospace Spotlight Awards Gala.

A nominee may be any K-12 teacher who supports AIAA in its efforts to bring "real world" STEM experiences to students. Past recipients may not apply for this award a second time. All recipients must be or become an AIAA Educator Associate member. Preference will be given to educators who demonstrate active participation and use of AIAA resources in their classroom.

- Nominations will open in Spring 2015.
- The nomination form and instructions will be posted when available.
- Self-nomination is NOT allowed.
- Incomplete submissions or submissions which exceed the page limit will NOT be considered.

Questions? Contact Carol Stewart at carols@aiaa.org or 703.264-7623.

[Subscribe](#) to the NCASE Monthly Newsletter and find out what thousands of young people and educators are doing!



4-H

Uses Model Rocketry for Science, Technology, Engineering and Math (STEM)

Rocketry is one of the most enjoyable projects 4-H has to offer. 4-H and the National Association of Rocketry have formed a [partnership](#) to help students learn about model rocketry and STEM.

Delaware County and Pennsylvania State University

Delaware County 4-H, for example, provides [Rocketry School Enrichment](#) and After School Enrichment Programs that 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.

Olympic Peninsula Rocketry in Jefferson County, Washington State

John Ludwig leads this 4-H club devoted to rocketry - he is enthusiastic about

rocketry and eager to share it with Jefferson County youth! OPROC meets at the Irondale Educational Annex adjacent to the Irondale Church and will host it's 6th [Pasture Blaster](#) in August 2015.



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 and the national Association of rocketry have formed a [partnership](#) to help students learn about model rocketry and STEM.

Muñoz Air National Guard Base Cadet Squadron, Puerto Rico

The Muñoz Air National Guard Base Cadet Squadron held a two-part Model Rocketry School in Trujillo Alto, with written and hands-on phases conducted separately for the 29 participating cadets.

Online instruction and exams were followed by the hands-on designing and building of Redstone, Titan, and Saturn stages rockets, culminating in launching.

Before the school began, Lt. Col. Janice Borrero, external aerospace education officer for Puerto Rico Wing Group VI, prepared, designed and moderated online sessions in which the cadets read about rocketry, watched instructional videos and took the exams for the three stages.

For the subsequent hands-on phase, with the help of the unit's senior and cadet staff Lt. Col. Juan Toro - Group VI officer for internal aerospace education and for cadet programs - taught the cadets how to built the Fizzy Flyer rocket, the Goddard Rocket, and two single-stage model rockets (air-powered and engine-powered).

The next day the participants moved to the launch area. After receiving safety instruction and a review of the National Association of Rocketry Safety Code, cadets watched their rockets lift off.

Once the launches were conducted, the squadron's commander, Lt. Col. Ismael Rodríguez, certified all 29 cadets as having completed the program and awarded them with the Model Rocketry badge and patch. [Check it out!](#)

National Standards-based Products

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/

Estes

It's almost spring...which is the prime time for model rocketry at schools! [Estes Educator](#) works with many educators daily, getting lots of calls and emails from teachers and youth group leaders who have never built and launched a model rocket but who want to do that with their students. Can you guess the two questions first-time rocketry teachers ask the most? They are "How do I get started teaching model rocketry?" and "What materials do I need to teach model rocketry?" These questions can be answered in [13 steps](#). And don't forget to check

out their new [downloadable iPhone app!](#)

Quest Aerospace

Paying Forward is a large part of model rocketry...Ever wonder where the concept originated? Take a look at the [records](#) for the birth of model rocketry, the formation of the first model rocket company Model Missiles, Inc. and the formation of the [Model Missile Association](#) (later to become the National Association of Rocketry). These artifacts will engage and inspire you, just as they did for so many others!



Wallops Rocket Academy for Teachers and Students (WRATS)

The Sounding Rockets Program Office (SRPO) and the Wallops Education Office host an annual workshop for approximately 20 educators. Three workshops have been held, starting in 2011. The workshop offers a week of hands-on rocketry activities for High School educators and includes an opportunity to see a sounding rocket launch from Wallops Island.

The first day of the workshop starts with introductions and an overview of NASA's Sounding Rockets Program. Participants also complete construction of an E powered model rocket on Monday. The second day is focused on the assembly of a payload for the model rockets. The past two years the payload has been Arduino Uno based with three sensors; pressure transducer, accelerometer and a thermistor. Wednesday is focused on interactive lectures on rocket physics conducted by Phil Eberspacher, Chief Sounding Rockets Program Office.

The lectures include demonstrations using a CO2 powered Rocket Cars, moment of inertia bars, and other easily obtainable materials. The center of gravity of the model rocket is measured and a stability swing tests are performed. Additionally participants measure the pitch moment of inertia on their models using a bifilar pendulum setup. OpenRocket, a rocket flight simulation software is used to predict flight performance.

On Thursday, day four of the workshop, participants attend a sounding rocket launch on Wallops Island. The payload on the sounding rocket includes student experiments from Universities and Colleges. The model rocket launches are conducted on Thursday afternoon on the Wallops airfield.

The last day of the workshop includes various presentations about NASA resources for educators and tours of Wallops Flight Facility.

Contact [Linda Sherman](#) by email to get information on the application process

Rocketry in South Africa

South Africa National Space Agency (SANSA)

Ever wonder what the space programs are like in other countries? Take a look at the [South Africa National Space Agency](#). Established in 2010, following a period of rapid growth and transition, the agency has made significant advancements towards addressing its mandate of deriving greater value from space science and technology for the benefit of South African society.

National Youth Development Trust

Similarly, how do teachers in other countries integrate rocketry into their programs? Check out what Mr. Adrian Meyer, the Chief Executive Officer for the [National Youth Development Trust](#), is accomplishing in South Africa.

Adrian writes, "Our Engineering Science programme has become popular rocketry and robotics are two of the very popular hobbies and favourite pastimes. Our Rockets and Robots Programme has been designed to create and nurture interest in engineering science at school, from grade 1 to grade 13 level. Rocketry and robotics are two different disciplines, and each has an independent programme."

There are, however, many young scientists who would like to follow a career in engineering; consequently, they are working closely with international role-players and stakeholders to establish formal rocketry and robotics programs for South Africa. They have also been working in countries such as Ethiopia, Cameroon, Botswana and Kenya to establish similar model rocketry programs.

South Africa Amateur Rocketry Administration (SAASA)

What about model rocketry? Established in 2003, [South Africa Amateur Rocketry Association](#) became the first rocketry association/organization to offer certification levels in South Africa. [SAASA](#) promotes model rocketry as being safe, reliable, accountable & fun, while also having elements that can be challenging, educational and competitive!

SAASA represents Hobby Rocketry, Model Rocketry, Sport Rocketry, Experimental/Amateur Rocketry as well as Applied Rocketry in South Africa. With a track record spanning more than 10 years, SAASA has the largest and best-established membership component and support infrastructure in South Africa. SAASA provides guidance, procedures and administration for the legal & safe participation in rocketry activities within South Africa.

RESOURCES

Rocketry School Supplies Provided by Donors

As teachers, you know your students' needs best. [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.



NASA Makes Finding Teaching Materials Easy

NASA's Education Materials Finder will help teachers 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 the best way to locate NASA educational resources. (<http://search.nasa.gov/search/edFilterSearch.jsp?empty=true>)

NASA's Adventures in Rocket Science Educator's Guide

This guide contains 25 activities designed for 4-H Clubs, Boys and Girls Clubs, Boy Scouts, Girl Scouts, after-school programs, and other informal education venues. Participants learn about the history and principles of rocketry and NASA's newest

rockets -- Ares I and Ares V. While doing these hands-on activities, participants also learn about Hero Engines, parachutes and surface area, altitude tracking, and Newton's Laws Of Motion. Learners can also build four types of rockets and two types of egg drops. Take a look at the [Adventures in Rocket Science Guide!](#)

NASA's Marshall Space Flight Center Education Page

NASA and the Marshall Space Flight Center strive to help maintain a strong American education system. They pursue this goal by nurturing students' interest in mathematics and science from elementary school through their college years, and by encouraging young people to consider careers in engineering and the aerospace industry. Browse the [Marshall Space Flight Center Education Page!](#)



National Association of Rocketry (NAR) offers Teachers and Youth Group Leaders Resources

The NAR offers [Free Resource](#) downloads produced by members who have helped teachers and youth group leaders like yourself all over the United States. Check these out and see if any match what you had in mind for your course!



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!>)

Aerospace/STEM Education Products

CAP's Aerospace/STEM Curriculum Products site contains, by grade level, [downloadable](#) pages in PDF. Additionally, take a look at their [Model Rocketry Guidebook!](#)

This Month in History

100 Years Ago



April 2, 1915: President Woodrow Wilson appointed the first 12 members of the National Advisory Committee for Aeronautics (NACA). Twenty one days later, on April 23, the Secretary of War called the first meeting in his office. Brig. Gen. George P. Scriven, Chief Signal Officer, was elected temporary chairman, and Dr. Charles D. Walcott, secretary of the Smithsonian Institution, was elected first chairman of the NACA Executive Committee.

95 Years Ago

April 1, 1920: The National Advisory Committee for Aeronautics approved the publication of Technical Report No. 91, "Nomenclature for Aeronautics." The purpose of the document was to promote the use of uniform technical terms and symbols.

90 Years Ago

April 13, 1925: Henry Ford started the first commercial flights that flew on a regular schedule. They flew airmail between Detroit and Chicago. Earlier that year he formed the Ford Air Transport Service and was awarded the Chicago-Detroit and Cleveland-Detroit airmail routes. Ford returned to manufacturing after three years of carrying the mail.

85 Years Ago

April 4, 1930: David Lasser, G. Edward Pendray, Fletcher Pratt and nine others founded The American Interplanetary Society, later the American Rocket Society (ARS), in New York City to promote interest in and work toward interplanetary expeditions and travel.

80 Years Ago

April 16-23, 1935: Pan American Airways' S-42 Pioneer Clipper flew from California to Honolulu and onward in a preliminary survey flight for a transpacific air route to Asia. By the end of the year, a new historical airmail route was established, heralding a new era of business and travel for Hawaii.

70 Years Ago



April 1, 1945: The U.S. Army fired the first of 17 Jet Propulsion Laboratory Private F rockets at Hueco Range at Fort Bliss, Texas as part of its historic Ordnance/CIT ballistic rocket program.

55 Years Ago

April 4, 1960: Frank D. Drake initiated Project Ozma using the 85-foot Howard E. Tatel Radio Telescope at the National Radio Astronomy Observatory at Green Bank, W. Va. It was the first systematic attempt to detect artificial radio signal patterns from nearby stars. After 150 hours of listening, the project returned no evidence. However, Project Ozma was the precursor for many more, increasingly sophisticated searches which continue today.

50 Years Ago April 6, 1965: The United States launched Intelsat I, the first commercial communications satellite, into geostationary orbit. Also called "Early Bird," the satellite provided the first scheduled transoceanic television service and was operational for 3.5 years.

45 Years Ago

April 11-17, 1970: NASA launched Apollo 13 via a Saturn-V rocket. About 56 hours into the flight, an oxygen tank in the Apollo service module exploded and damaged several of the systems, including life support. People throughout the world watched, waited and hoped as NASA personnel on the ground and the Apollo crew worked together to find a way safely home. Astronauts Jim Lovell, Fred Haise and Jack Swigert used the lunar module as a lifeboat before returning to the control module for reentry. After a dramatic period of innovative recalculation at Mission Control Center at NASA's Kennedy Space Center in Houston, Texas, the crew returned safely six days later.

35 Years Ago

April 26, 1980: The U.S. Department of Defense launched the NavStar 6 navigation satellite via Atlas F rocket from Vandenberg Air Force Base in California. The NavStar Global Positioning System (GPS) is a radio-positioning system of satellites that provides navigation and timing information to military and civilian users across the globe.

30 Years Ago

April 29, 1985: NASA launched the space shuttle Challenger (STS-51B) from Kennedy Space Center, Fla. It was the first operational flight for the Spacelab orbital laboratory series developed by the European Space Agency (ESA). The orbiter made its first crosswind landing at Edwards Air Force Base in California at the end of this mission.

25 Years Ago



April 24, 1990: NASA launched the Hubble Space Telescope on space shuttle Discovery (STS-31). Soon after launch, controllers found that the telescope was flawed by a mirror defect only 1/25th the width of a strand of human hair. Scientists found a way to work around it using computer enhancement, and engineers planned a shuttle repair mission to fully correct it. Hubble has made many important astronomical discoveries, including generating images of galaxy M87 and providing evidence of a potentially massive black hole.

20 Years Ago

April 3, 1995: NASA launched the MicroLab 1 mini-satellite on a Pegasus rocket carried aloft by an L-1011 aircraft flying out of Vandenberg Air Force Base in California. The mini-satellite carried meteorological experiments designed to track lightning and to provide detailed temperature and moisture profiles across the globe. Data from this mini-satellite has shown that more than 1.2 billion lightning flashes occur around the world every year, with more lightning strikes occurring over land masses than over the oceans.

15 Years Ago

April 4, 2000: Russia launched Soyuz TM-30 from The Baikonur Cosmodrome in Kazakhstan on the last Soyuz mission to the 14 year-old Mir space station. Cosmonauts Zalyotin and Kaleri reactivated the uninhabited station and used two Progress spacecraft to raise the station's orbit. Prior to this mission, Mir's orbital plane was only around 120 degrees away from the International Space Station, making transport between the two stations impossible.

10 Years Ago

April 15, 2005: Russia launched Soyuz-TMA 6 from The Baikonur Cosmodrome in Kazakhstan carrying the Expedition 10 crew to the International Space Station. The crew included three astronauts; Sergei Krikalev (Russian), John Phillips (American) and Robert Vittori (Italian.) During the mission, Krikalev broke the record for total time in space. Fifty-four years in March, NASA's Pioneer 4 probe flew within 37,000 miles of the lunar surface. In doing so, the tiny spacecraft flew the first successful American lunar flyby mission.

Manufacturers

Looking for a book to stimulate your imagination or stir your creative thoughts? Check out [ARA Press](#) and their new book [N1: For the Moon and Mars!](#)

Can't fly solid propellant motors at your school? No worries...[Quest Water Rockets](#) are the perfect low-cost flying rocket without solid propellant rockets! There's no fire danger (the rocket fuel is water) and no HazMat fees to ship them!

There's no-cost per launch - You can fly them over and over and YOU control the flight performance by varying amount of fuel and pressure. Flies to over 200 feet are possible!

What additional items do you need to provide? You'll need a PET soda bottle - 24 oz, 1 liter, or 2 liter and you'll need a standard bicycle pump with a pressure gauge. Quest also suggests a "low temp" hot melt glue gun to apply fillets to the outside of each fin joint - this assures a perfect fin alignment every time because each fits into a pre-cut and slotted area for each fin. If you don't have a hot-melt glue gun, you can also use White Glue, but you'll have to wait until the glue dries overnight before flying your

rocket.

Included in the Starter Set are supplies to build your first water rocket (except you supply the PET bottle), and a complete Launch System.

Additionally , you'll get:

1 pre-cut Rigid Foam Fin Set

1 translucent molded nozzle

1 Foam Recovery bumper

Color assembly and use instructions

1 Fuel measuring flask

[Estes](#), takes a different approach to the same dilemma...[Air rockets](#)! Air powered and no batteries needed these are ready to fly! The Rocket-Stars (you get 2 air rockets) just need their colorful decals applied! Simply attach the foam launch legs to the foam launch base and you are ready to blast off!

In addition to the 2 foam rockets [9 in. (22.9 cm) and 6.3 in. (16 cm) tall], you get a sturdy rubber ball and air hose for launching. Heights of 50 ft. (15.2 m) are possible.

Looking for something more unusual? Try [Art Applewhite](#) and [Fliskits](#) for all sorts of unique odd rocs!

Need a special balsa part made? Or body tubes of all sorts and sizes? Take a look at [Balsa Machining Services](#)!

Looking for discounted kits and supplies? Give **Belleville Wholesale Hobby** a call at 1-618-398-3972!



Quick Links...

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[Our Website](#)

[NAR Teacher Resources](#)

[Find a Local Club](#)

[Model Rocket Safety Code](#)

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