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Spectacular October Moon Eclipse

On Wednesday morning, Oct. 8th, not long before sunrise, the bright full Moon over North America will turn a lovely shade of celestial red. It's a lunar eclipse—visible from all parts of the USA.



"It promises to be a stunning sight, even from the most light polluted cities," says NASA's longtime eclipse expert Fred Espenak. "I encourage everyone, especially families with curious children, to go out and enjoy the event."

Times for Eastern US Viewing:

Penumbra first visible	4:45 AM
Partial Eclipse	5:15 AM
Total eclipse	6:25 AM
Total eclipse ends	7:24 AM

Moon set at 7:28 AM will prevent viewing of the disappearance of the penumbra from the east coast of North America,

The Moon will be hanging low over the western horizon, probably swollen by the famous Moon illusion into a seemingly-giant red orb, briefly visible before day-break. During a lunar eclipse, the Moon passes deep inside the shadow of our planet, a location that bathes the face of

the Moon in a coppery light.

A quick trip to the Moon explains the color: Imagine yourself standing on a dusty lunar plain looking up at the sky. Overhead hangs Earth, nightside down, completely hiding the sun behind it. The eclipse is underway.

You might expect Earth seen in this way to be utterly dark, but it's not. The rim of the planet is on fire! As you scan your eye around Earth's circumference, you're seeing every sunrise and every sunset in the world, all of them, all at once. This incredible light beams into the heart of Earth's shadow, filling it with a coppery glow and transforming the Moon into a great red orb.

However, red is not the only color. Many observers of lunar eclipses also report seeing a band of turquoise.

The source of the turquoise is ozone. Atmospheric scientist Richard Keen of the University of Colorado explains: "During a lunar eclipse, most of the light illuminating the moon passes through the stratosphere where it is reddened by scattering. However, light passing through the upper stratosphere penetrates the ozone layer, which absorbs red light and actually makes the passing light ray bluer." This can be seen, he says, as a soft blue fringe around the red core of Earth's shadow.

To catch the turquoise on Oct. 8th, he advises, "look during the first and last minutes of totality. The turquoise rim is best seen in binoculars or a small telescope."

The depth and hue of lunar eclipse colors depends a lot on the dustiness of the stratosphere. When volcanoes erupt and chock the stratosphere with aerosols, lunar eclipses can turn such a deep red that the Moon looks almost black. That's not the case this time, however:

"Despite some recent eruptions that look spectacular from the ground, there have been no large injections of volcanic gases into the stratosphere," says Keen. "In the absence of volcanic effects, I expect a rather normal reddish-orange lunar eclipse similar in appearance to last April's eclipse."

In other words, this is going to be good.

Espenak notes that "the total lunar eclipse of Oct. 8 is the second of four consecutive total lunar eclipses. Such a set of total eclipses is known as a tetrad." The next eclipse in the tetrad is six months from now, in April 2015.

AND A PARTIAL SOLAR ECLIPSE!

Another don't miss is the upcoming partial solar eclipse on Oct. 23. The eastern US will be able to see it for a short time in the early evening before sunset. Check out the timing at:

<http://earthsky.org/tonight/partial-solar-eclipse-for-north-america-on-october-23>

Credits:

Author: [Dr. Tony Phillips](#) | Production editor: [Dr. Tony Phillips](#) | Credit: Science@NASA Edited by Pamela Casto

A Year of Robotics: October 1, 2013 to October 1, 2014

by Ryan Utzman, Michael Lyden and Jaime Ford

A “year “ at NASA runs from the first of October to the first of October the following year. What a year this has been!

Important Events 2013-2014

12/7/2013 - State Tournament for FLL at FSU

The state tournament hosted 68 FLL teams at the Nature’s Fury Challenge.

1/9/2014 - \$10,000 donation for FIRST robotics program

A generous gift of \$10,000 was donated by the Bharti family to aid in robotic outreach across the state of WV.

1/17 & 1/18/2014 - VEX Tournament at FSU

NASA’s IV&V ERC supported the first ever VEX Championship tournament in West Virginia hosted at Fairmont State University. A training on VEX software programming followed in July.

5/10/2014 - FTC Training

A new series of trainings began on FTC software programming to help rookie teams prepare for the next competition season.

Jun-Sep 2014 - FLL Boot Camps across the State

Four boot camps were implemented by FIRST AmeriCorps VISTAs Darek, Ryan H., Michael, and Ryan U. The boot camps helped rookie teams with EV3 software, as well as with expectations for the FLL tournaments.

8/1 & 8/2/2014 - WV RoX

A 26 hour 14 minute FRC endurance event held at WVU and hosted by MARS Team #2614. Thirteen states and Canada were in attendance.

9/26 & 9/27 - Jr. FLL Trainings for Coaches

A series of trainings were devised to help coaches start Jr. FLL teams in an effort to increase awareness and participation in the FIRST programs.

Upcoming Robotic Events

10/2-3 FFL Training, Boone County 8:00 AM—2 PM

10/4 Jr. FLL Training, NASA SEMAA, Beckley 4-8:00 PM

10/13 WeDo Workshop, West Milford

10/25 FLL Scrimmages at WVU-P and BridgeValley with presentation to Wood County Middle School Conference

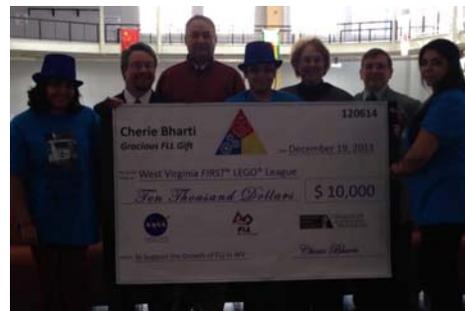
11/1 FLL Scrimmages at WVNCC and New River CTC

11/8 FTC Scrimmage at Westwood in Morgantown

Photo Highlights



FLL State Tournament at FSU



Bharti Donation of \$10,000



New Robotics Trailer!!!



VEX Tournament January 2014



World Class Element Build

A Year of Rocketry by Jaime Ford

Important Events 2013-2014

10/5/2013 - Rocket Boy Festival

The ERC set up several stations, participants from all ages enjoyed, which included a solar station, a Mars Lander engineering challenge, a shuttle simulation, and a robotic challenge at the Rocket Boys Festival in Beckley, WV.

10/26 & 10/27/13 - "October Sky" TARC Camp

Teams from Gilmer, Logan, Berkeley, Harrison, Mon, and Marion counties visited NASA's IV&V ERC for a 2 day rocket camp in support of the STEM challenge TARC "Team America Rocketry Competition."

5/15/2014 - S4 Planning Begins

"Small Satellites for Secondary Students" is an opportunity for TARC teams to go to the next level. The S4 initiative is a pilot collaboration between NASA's IV&V ERC, WVU Physics, and the WV Rocketry Association to solder, design, and test a scientific payload built off an Arduino platform at WVU and test it on a tethered balloon launch. This October the WV Rocketry Club will build and fly a level 1 Rocket with the students' payload up to 2,000 feet!! <http://s4.sonoma.edu/>

8/4 & 8/5 - TARC Summer Camp

Six teams from Mon, Marion, Ohio, Lewis, and Mineral County, as well as two teams from Virginia attended this past summers TARC camp.

8/22/2014 - NASA IV&V Office Rocket Competition

Employees from NASA's IV&V took part in an inner office rocket competition to benefit the Feds Feed Families food drive. Teams had a chance to purchase different types of rockets from straw to model, each rocket costing a certain number of cans. Upgrades for each rocket could also be bought with additional cans.

Educator Rocketry Workshop

Over the last year educators have requested many workshops that certified them to borrow kits for basic rocketry or more advanced rocketry - model rocketry. For more information on an educator rocketry workshop contact Pam Casto or Todd Ensign.

Student Rocketry Workshop

Student rocketry workshops were popular over the last year as well. For more information contact Jaime Ford.

Upcoming Rocketry Events

10/11 -12 "October Sky" TARC Camp

10/12 S4 Rocket Launch at Mylan Park

Photo Highlights



"October Sky" TARC Camp



S4 student soldering an Arduino



3D Printer Parts for a Rocket



Office Rocketry Competition



Oops! Parachute Did NOT Deploy



Student Rocketry Workshop

**A FEW
HIGHLIGHTS
FROM
THE PAST YEAR**

**Too bad these robots
can't take selfies!**



Pre-service students explore **WeDo Robotics**



The scale of the Solar System
amazes students who attend
Planetary Geology



The Clays Center's **Family Science and Engineering Day**
**A rain gauge for
your yard anyone?**



The EM Spectrum Chart contains a wealth of
information as educators learn to make **The
Invisible Detectable**

Got toilet paper?



Viewing the Universe with Telescopes
was popular in 2014

Kindernauts is being
updated for 2015

It flies!



Museum In A Box Workshop at the Robert
C. Byrd Institute

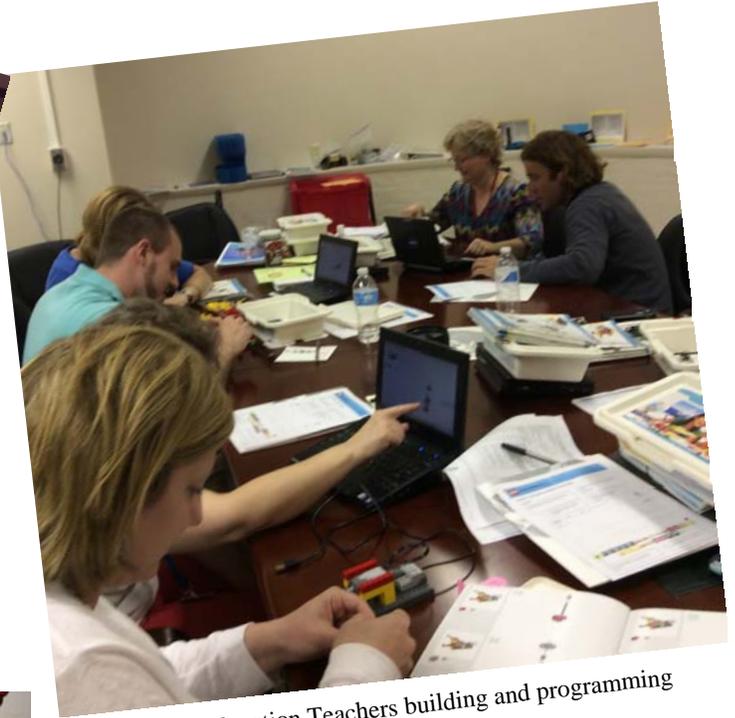


Spacewalks
are a breeze
in our new
suits!

**Computerization makes it
easy! And don't miss trying
out our new Wi-Fi scope**



Students visiting NASA IV&V connect with astronaut Dottie Metcalf-Lindenberger to learn about **Living and Working in Space**



Shenandoah Junction Teachers building and programming LEGO animals



Educators at STARBASE in Berkeley County work as a team as they explore robotic arm movements and later acted out the life cycle of stars in **Afterschool Universe**



WV SPOT presentations were offered throughout the state as well as at the ERC



IV&V engineers enhance workshop experiences for students and educators

Contact us:

ERC Staff

Todd Ensign ...Program Manager

todd.ensign@ivv.nasa.gov 304-367-8438

Pam Casto...Education Specialist

pam.casto@ivv.nasa.gov 304-367-8436

Jaime Ford ...Student Programs

jaime.ford@ivv.nasa.gov 304-367-8379

Ryan Utzman...AmeriCorps VISTA

rutzman@usfirst.org

Michael Lyden...AmeriCorps VISTA

mlyden@usfirst.org

Alicen Patton...ERC Intern / Office Manager

alicen.patton@ivv.nasa.gov 304-367-8251

Jennifer See....ERC Intern / Equipment Loan

jennifer.see@ivv.nasa.gov 304-367-8379

To schedule a workshop:

Contact the ERC by calling 304-367-8436 or emailing:

pamela.casto@ivv.nasa.gov

To schedule equipment for loan: First check the equipment loan calendar on the ERC website to see if the equipment is available, then email Jennifer See who will schedule the dates.

jennifer.see@ivv.nasa.gov

Check us out on Facebook:

www.facebook.com/groups/33814011198

And Twitter: @NASAIVV_ERC

NASA IV&V Robotics Alliance

www.WVRoboticsAlliance.org

Links to Student Competitions

First Lego League Robotics:

www.firstlegoleague.org/

WV FLL on Facebook

www.facebook.com/wvflfll

Real World Design Challenge:

www.realworlddesignchallenge.org/

Team America Rocketry Challenge:

www.rocketcontest.org/

October Events: See pages 2,3 for rocketry and robotic events

1, 2 Lunar/Meteorite Certification ..Fairmont State University

8 STARLAB... Berkeley Springs

9 NASA Booth/Library Conference...Snowshoe Resort

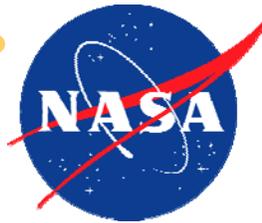
15 GPS...Martinsburg

17 NASA Booth for Lights On Afterschool...Monongalia County

21 EM Spectrum and GPS for the Adult Education Conference...Morgantown

23 NASA Booth for Lights on After School...Marion County

25 ERC Presentation at Girl Scout Conference...Preston County



Quotes of the Month:

A child without education, is like a bird without wings.

Tibetan proverb

If a child can't learn the way we teach; maybe we should teach the way they learn.

Ignacio Estrada

ERC Metrics 10/2013 to 10/2014

The ERC has a total of 48 kits of equipment to loan to formal educators, informal educators and pre-service students. As the ERC has multiples of the most popular kits, there is still an amazing total of 33 unique kits. For the year a total of 12,989 student uses of kits were recorded. This number is likely low as we did not always receive numbers back from some loans. It also does not reflect the kits or partial kits used in many multiple community or educational events such as Science and Engineering Day (approximately 300 hundred) or Day in the Park (approximately 800 students).

The ten most popular kits in order of most uses were:

STARLAB

NXT Robots

GPS

WeDo Robots

Basic Rocketry

NASA Remote Sensing and Dinosaurs

Kindernauts

Telescopes

Thermal Protection Systems

