



Volume 25, Number 9

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Measure the moon's size and distance during the next lunar eclipse

By Ethan Siegel

The moon represents perhaps the first great paradox of the night sky in all of human history. While its angular size is easy to measure with the unaided eye from any location on Earth, ranging from 29.38 arc-minutes (0.4897°) to 33.53 arc-minutes (0.5588°) as it orbits our world in an ellipse, that doesn't tell us its physical size. From its angular size alone, the moon could just as easily be close and small as it could be distant and enormous.

But we know a few other things, even relying only on naked-eye observations. We know its phases are caused by its geometric configuration with the sun and Earth. We know that the sun must be farther away (and hence, larger) than the moon from the phenomenon of solar eclipses, where the moon passes in front of the sun, blocking its disk as seen from Earth. And we know it undergoes lunar eclipses, where the sun's light is blocked from the moon by Earth.

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President's Article

By Tim Campbell

The Big List

This is perhaps the busiest month for the club, so I thought I'd give an update on all the activity in play.

This month a few of our members went to the Black Forest Star Party in Cherry Springs State Park, Pennsylvania. This star party has particularly good dark skies and is located about 8 hours driving distance. That was the weekend of the New Moon.

Sneaking in just before the Great Lakes Star Gaze was Henry Ford College "Welcome Back Days" for students. The HFC Student Astronomy Club has a table at this event and our club helps support and drive membership to the student club (HFC Student Club members get free membership in our club as a benefit and in gratitude to the college for providing us our meeting location each month.) Several members set up solar scopes at this weekday event.

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STAR STUFF

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SECRETARY: Ellen Duncan
TREASURER: Gordon Hansen
WEBMASTER: Greg Ozimek
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Club Information:

The Ford Amateur Astronomy Club (FAAC) meets on the fourth Thursday each month, except for the combined November/December meeting on the first Thursday of December - at Henry Ford College Administration Services and Conference Center in Dearborn. Refer to our website for a map and directions (www.fordastronomyclub.com).

The FAAC observes at Spring Mill Pond within the Island Lake State Recreation Area near Brighton, Michigan. The club maintains an after-hours permit, and observes on Friday and Saturday nights, and nights before holidays, weather permitting. The FAAC also has use a private observing site near Gregory Michigan and Lake Erie Metro Park. See the FAAC Yahoo Group* for more information.

Observing schedules and additional info are available on our website, or via the FAAC Yahoo Group.* Or call the FAAC Hotline, for info and leave a message, or ask questions: 313-757-2582. or send email inquiries to info@fordastronomyclub.com.

Membership in the FAAC is open to anyone with an interest in amateur astronomy. The FAAC is an affiliate of the Ford Employees Recreation Association (F.E.R.A.). Membership fees:

Annual - New Members: \$30 (\$15 after July 1)
Annual - Renewal: \$25 (\$30 after January 31)

Membership includes the STAR STUFF newsletter, discounts on magazines, discounts at selected area equipment retailers, and after-hours access to the Island Lake observing site.

Astronomy or Sky & Telescope Magazine Discounts

Obtain the required form from the FAAC club treasurer for a \$10 discount. Send the completed form directly to the respective publisher with your subscriptions request and payment. Do not send any money directly to the FAAC for this.

Star Stuff Newsletter Submissions

Your submissions to STAR STUFF are welcome! Send your story and/or images to the editor: StarStuff@fordastronomyclub.com. Email text or MS Word is fine. STAR STUFF will usually go to press the weekend prior to each general meeting. Submissions received prior to the 15th can be included in that issue.

* FAAC Members are welcome to join our Ford Astronomy Club Yahoo!Group. Messages photos, files, online discussions, and

This month's background photos of the moon Page 1 courtesy of John Kirchhoff. See more of John's photos at:

<http://www.flickr.com/photos/33926475@N06/with/4311533997/>

The weekend leading up to the 1st Quarter Moon was the Great Lakes Star Gaze in Gladwin Michigan. Several members make the annual trek up to enjoy the dark skies and even when the weather is marginal, there are so many club members and members of other clubs that it ends up being a social event unto itself (the final night was spectacularly clear and even had an aurora.)

Next up is Astronomy at the Beach at Kensington Metropark (Maple Beach). The event runs from 6pm to Midnight both Friday and Saturday, September 25 & 26. This is the largest event of the year and typically has around 4500 visitors. This year the event is on the weekend leading up to the full moon — which means a bit more light pollution than we'd prefer (normally this is the weekend of the 1st Quarter Moon.) I think the planners could still use a few more table volunteers. Also, if you have old issues of astronomy magazines that you'd like to give away (Astronomy, Sky & Telescope, etc.) bring those along and put them on the club table.

A Full Lunar Eclipse follows on Sunday. Originally the GLAAC member clubs had thought to just meet at Kensington again, but the eclipse begins shortly after moonrise so a clear view to the East is helpful. Maple Beach doesn't have a clear view to the Eastern horizon because the beach is at the bottom of a hill. Instead, handouts will be given to attendees of Astronomy at the Beach with a list of observing locations that clubs will use. Several club members plan to meet at our normal observing location at Island Lake State Recreation Area (Spring Mill Pond) — although lunar eclipses do not require dark skies, so any location could work. Some members may be meeting at Lake Erie Metropark (those who live downriver and for whom Island Lake is a substantial drive.) We can discuss observing locations at the club meeting to confirm.

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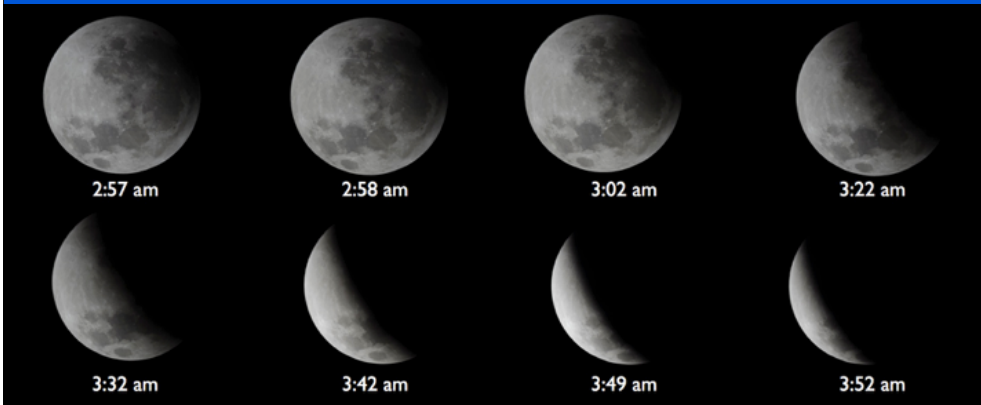


Image credit: Daniel Munizaga (NOAO South/CTIO EPO), using the Cerro Tololo Inter-American Observatory, of an eight-image sequence of the partial phase of a total lunar eclipse.

Measure the moon's size and distance during the next lunar eclipse

(continued from Page 1)

Lunar eclipses provided the first evidence that Earth was round; the shape of the portion of the shadow that falls on the moon during its partial phase is an arc of a circle. In fact, once we measured the radius of Earth (first accomplished in the 3rd century B.C.E.), now known to be 6,371 km, all it takes is one assumption—that the physical size of Earth's shadow as it falls on the moon is approximately the physical size of Earth—and we can use lunar eclipses to measure both the size of and the distance to the moon!

Simply by knowing Earth's physical size and measuring the ratios of the angular size of its shadow and the angular size of the moon, we can determine the moon's physical size relative to Earth. During a lunar eclipse, Earth's shadow is about 3.5 times larger than the moon, with some slight variations dependent on the moon's point in its orbit. Simply divide Earth's radius by your measurement to figure out the moon's radius!

Even with this primitive method, it's straightforward to get a measurement for the moon's radius that's accurate to within 15% of the actual value: 1,738 km. Now that you've determined its physical size and its angular size, geometry alone enables you to determine how far away it is from Earth. A lunar eclipse is coming up on September 28th, and this supermoon eclipse will last for hours. Use the partial phases to measure the size of and distance to the moon, and see how close you can get!

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Treasurer's Report September 13, 2015

By Gordon Hansen

Sep 13, 15

ASSETS

Current Assets

Checking/Savings

10000 · Checking 131.31

11000 · FAAC Savings

11100 · FAAC Club Savings 1,376.50

11200 · Equipment 2,114.70

11300 · Scholarship 263.26

11400 · GLAAC 5,868.16

Total 11000 · FAAC Savings 9,622.62

12000 · Petty Cash Account 55.83

13000 · CD's

13100 · CD 200599272 1,062.14

13200 · CD 205196033 1,007.04

13300 · CD 89265268 1,110.42

Total 13000 · CD's 3,179.60

Total Checking/Savings 12,989.36

Total Current Assets 12,989.36

Meeting Agenda - September 24th

HFC – Berry Auditorium -Admin. Services & Conference Center www.fordastronomyclub.com
5:30

Opening/Introduction/Member Observing

Main Presentation:

Tech Talk:

Club Projects/Committees/Member Support

Club Business/Secretary/Treasurer/Equipment Reports

President's Article

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We've also received requests for at least three different school outreach events. Spiritus Santas Academy in Plymouth has requested an outreach on the night of Friday, October 16. Also both Lincoln Park Middle School and West Middle School in Taylor have requested outreach events (These events have not yet been scheduled but would be daytime solar-viewing events. Ideally we try to find a suitable date near the 3rd Quarter Moon since the moon will be visible in the sky during morning school hours.)

Next up (in October, but prior to October's club meeting and likely prior to the next issue of the Star Stuff Newsletter) is the annual "Erie Skies" beginner's night and outreach at Lake Erie Metropark. That event will be held on Saturday, October 17 and in addition to the telescopes members normally set up for beginner's nights there will also be an Astronomy 101 presentation in the park nature center museum.

That concludes my list for September and going into October.

Astro Imaging SIG

Gordon Hansen

All are invited to join us in the Astro Imaging SIG meetings, to share and discuss images, experiences, and techniques.

We always have a good time, with lively discussion, and sharing of valuable information.

Next meeting is **October 8th**. The meeting room location – HFCC Admin. Services and Conference Center (same building), Berry Amphitheater Auditorium.

Topics invited. Pizza served.

FAAC Events 2015

September 24th - General Meeting - HFC 5:30p

September 25th & 26th - Astronomy at the Beach-Kensington Metro Park 6p

October 8th - Astro Imaging SIG meeting - HFC 5:30p

October 16th - Spiritus Santas school Outreach

October 17th - Beginner's Night "Eerie skies-LEMP"

Background Photo from Lunt Solar Scope Image taken at the Hector J Robinson Observatory, June 28, 2010

One FAAC members blog

<http://hjrobservatory.blogspot.com/>

A few updates on the observatory, quick articles and photos. I'll try to improve my writing on this blog. Also, I try to keep daily updates on this blog. - Greg Knekleian, HJRO volunteer.

Classified

Dobstuff Telescope For-Sale

with a 16 inch -- 1.5 inch thick -- F4.5 mirror

from a Meade Equatorial Starfinder

Built in September 2011

6 point all aluminum mirror cell

2-speed 2-inch Moonlite Focuser

Destiny curved 3 vane Spider

3.1 inch Coulter Secondary

This is a Push-To Telescope with Homemade Digital Setting Circles (DSC) using a Tungsten T3 Palm Pilot.

Paperwork, history of mirror, sketches, drawings, etc.

All in a 3-ring binder..

Have over \$2100 invested...Selling for \$1875

Rick Arzadon – N8XI

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Taylor, MI 48180

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Telephone: 313-561-4839



FAAC Equip Report 9/11/15

By Dennis Salliotte

<u>Item</u>	<u>Currently Held By:</u>	<u>Date Last Verified</u>
Telescopes		
4" Dobsonian (Harold's donation)	George Korody	1/22/15
Presentation Tools		
Projector (older)	Jim Frisbie	6/30/15
Projection Screen 8'	Bob MacFarland	5/13/15
Speaker System w/wireless mic	Bob MacFarland	5/13/15
Bullhorn	George Korody	1/22/15
DVD Player	Jim Frisbie	1/6/15
Projection Screen 6'	Mike Dolsen	4/23/15
Projector, ViewSonic	Gordon Hansen	7/28/15
Demonstration Tools		
Weight On Planets Scale	George Korody	1/22/15
Lunar Phase Kit	Bob MacFarland	5/13/15
100 ft Scale Model Solar System Kit	Bob MacFarland	5/13/15
Display Items		
Astronomy Event Sign (3' X 6')	Gordon Hansen	5/13/15
PVC Display Board - Folding	Sandra Macika	7/6/15
Banner – Small (24" X 32")	George Korody	1/22/15
Banner – Medium (24" X 72")	Sandra Macika	4/30/15
Banner – Large (32" X 16')	Dennis Salliotte	9/11/15
Tri-Fold Presentation Boards	Don Klaser	8/12/15
Tri-Fold Poster Board (Early Club Photos)	George Korody	1/22/15
Other		
Canopy (10' X 10')	Tim Campbell	4/2/15
Equipment Etching Tool	Greg Ozimek	4/2/15
Pop Cooler	Michael Dolsen	4/23/15
EQUIPMENT KITS		
Telescopes		
TK3 Celstrn 130 Newt Goto mount	Liam Finn	2/13/15
TK4 Clstrn 90 Refrctr w/man mount	Liam Finn	2/13/15
TK5 4 1/2 " Reflector, on Fitz GEM mount	George Korody	1/22/15
TK6 8" Orion 8XTi Dobsonian	Jennifer Monske CARETAKERSHIP IS AVAILABLE	9/11/15
TK1 Coronado PST solar scope w/double stack, Meade Autostar Goto mount & tripod and accessories	John McGill	1/22/15
Binoculars		
BK3 15x70 binocs, monopod mount	Bob MacFarland	5/13/15
BK4 20x80 binocs, altaz goto mount	Sandra Macika	2/5/15
BK5 25x70 binocs w/tripod adaptor	Tim Dey	2/13/15

FAAC Equip Report 9/11/15

By Dennis Salliotte

<u>Eyepiece Kit</u>		
EPK1 Eyepieces, filters & accesories	Liam Finn	2/13/15
<u>Other</u>		
TA Sky Quality Meter	Syed Saifullah	6/22/15
TA Sky Atlas 2000.0	Tim Dey	2/13/15
TA Orion telescope binoviewer	Liam Finn	2/13/15
<u>Lincoln Park Observatory</u>		
LPO Celestron binoviewer #93691	Tim Dey	3/16/15
LPO Celestron 2X 1.25" Barlow	Tim Dey	3/16/15
<u>Imaging SIG</u>		
C1 Celestron NexImage Solar System Imager model #93712	Gordon Hansen	5/13/15
C2 Meade Deep Sky Imager PRO III w/AutoStar Suite	Gordon Hansen	5/13/15
C3 Orion StarShoot Deep Space Video Camera NTSC #52185 w/video capture device #52178	Gordon Hansen	3/16/15
C4 Meade Electronic Eyepiece w/cable to a video monitor, VCR or TV. Pairw#43 AND Meade 3.5" LCD Color Monitor Kit # 07700 Complete (unused). Pair w#34	Gordon Hansen	5/13/15
C5 Orion StarShoot Deep Space Video Camera II #52195 AND Orion StarShoot iPhone Control for Deep Space Video Camera II #52195	Gordon Hansen	5/13/15
CA1 Rigel Systems Spectroscope	Gordon Hansen	5/13/15
CA2 Celestron 1.25" to T-Adapter(male thread) Model #93625	Gordon Hansen	5/13/15
CA3 Canon EOS deluxe astrophoto kit FOR Canon bayonet T-thread adapter ans variable 1.25" extender	Gordon Hansen	5/13/15
CA4 Orion StarShoot LCD-DVR #58125 2.5" LCD screen	Gordon Hansen	5/13/15
CA5 Celestron Canon EOS T-ring adapter #93419	Gordon Hansen	5/13/15
<u>Special Event Use Only- Not Available For Loan Out</u>		
TK2 Meade 8" ETX-LS-ACF w/tripod, voice assist, computerized GPS plus MANY (35+) accessories	Tim Dey	2/13/15
BK1 Orion BT-100 binocular telescope w/hard case, Orion VersaGo h.d. man altaz mount w/Vixen dovetail head and Vixen style binocular holder bracket	Ken Anderson	5/15/15
BK2 Zhumell 25x100 binoculars, hard case & Zhumell TRH-16 tripod w/soft fabric bag	Sandra Macika	2/5/15
TAK1 Night Vision Intensification binocular unit	George Korody	1/22/15
Dennis Salliotte equipment@fordastronomyclub.com		

Ford Amateur Astronomy Club
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