Star Stuff
Ford Amateur Astronomy Club Newsletter
Volume 26, Number 7 August 2016

Is there a super-Earth in the Solar System out beyond Neptune?

By Ethan Siegel

When the advent of large telescopes brought us the discoveries of Uranus and then Neptune, they also brought the great hope of a Solar System even richer in terms of large, massive worlds. While the asteroid belt and the Kuiper belt were each found to possess a large number of substantial icy-and-rocky worlds, none of them approached even Earth in size or mass, much less the true giant worlds. Meanwhile, all-sky infrared surveys, sensitive to red dwarfs, brown dwarfs and Jupiter-mass gas giants, were unable to detect anything new that was closer than Proxima Centauri. At the same time, Kepler taught us that super-Earths, planets between Earth and Neptune in size, were the galaxies most common, despite our Solar System having none.

The discovery of Sedna in 2003 turned out to be even more groundbreaking than astronomers realized. Although many Trans-Neptunian Objects (TNOs) were discovered beginning in the 1990s, Sedna had properties all the others didn't. With an extremely eccentric orbit and an aphelion taking it farther from the Sun than any other world known at the time, it represented our first glimpse of the hypothetical Oort cloud: a spherical distribution of bodies ranging from hundreds to tens of thousands of A.U. from the Sun. Since the discovery of Sedna, five other long-period, very eccentric TNOs were found prior to 2016 as well. While you'd expect their orbital parameters to be randomly distributed if they occurred by chance, their orbital orientations with respect to the Sun are clustered extremely narrowly: with less than a 1-in-10,000 chance of such an effect appearing randomly.

Continued on Page 2

Presidents Article

By Timothy Campbell

Outreaches and Other Astronomy Events

Picnic & Perseids:

This past month (last weekend as I write this) we enjoyed the Perseid meteor showers and club picnic. Though the weather looked … unpleasant … things turned out to be surprisingly better than expected. Skies actually did mostly open up providing huge regions of clear sky for most of the evening.

Given the rain earlier in the day and the clouds for most of the day, I wasn't expecting many visitors to the park to take advantage of Meteors & S'mores. But we did actually have quite a few visitors. If I had to guess… I think there were probably somewhere between 50-75 visitors. We had a few Perseids and quite a bit of interest in looking at planets and other objects through the telescopes. I think the visitors left feeling very happy about what they were able to see.

Astronomy at the Beach:

Next month's big event is Astronomy at the Beach (AatB) on September 9th & 10th. This annual event tends to draw about 4500 visitors spread across both nights.

Continued on page 4

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Whenever we see a new phenomenon with a surprisingly non-random appearance, our scientific intuition calls out for a physical explanation. Astronomers Konstantin Batygin and Mike Brown provided a compelling possibility earlier this year: perhaps a massive perturbing body very distant from the Sun provided the gravitational "kick" to hurl these objects towards the Sun. A single addition to the Solar System would explain the orbits of all of these long-period TNOs, a planet about 10 times the mass of Earth approximately 200 A.U. from the Sun, referred to as **Planet Nine**. More Sedna-like TNOs with similarly aligned orbits are predicted, and since January of 2016, another was found, with its orbit aligning perfectly with these predictions.

Ten meter class telescopes like Keck and Subaru, plus NASA's NEOWISE mission, are currently searching for this hypothetical, massive world. If it exists, it invites the question of its origin: did it form along with our Solar System, or was it captured from another star's vicinity much more recently? Regardless, if Batygin and Brown are right and this object is real, our Solar System may contain a super-Earth after all.

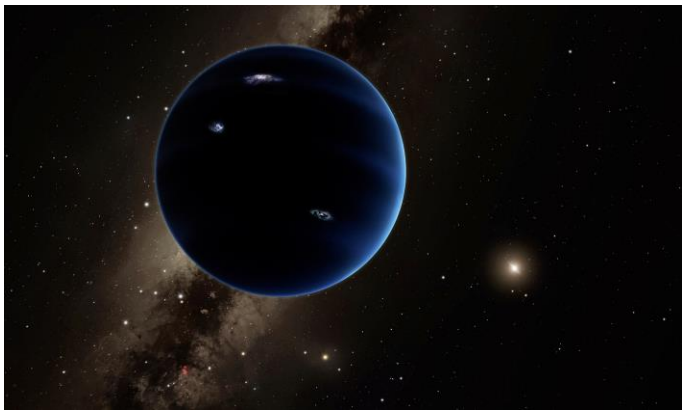


Image credit: R. Hurt / Caltech (IPAC)
A possible super-Earth/mini-Neptune world hundreds of times more distant than Earth is from the Sun.

FAAC Speaker Schedule			
August 25	**Presentation**	**Dr. Nicolle Zellner**	**Impacts in the Earth-Moon System - What, When, and Why**
	Tech Talk	**?**	**?**
September 22	**Presentation**	**Tim Campbell**	**Earth, Sun and Stars**
	Tech Talk	**Gary Repella**	**Lunar 100**

Treasurers Report

August 2016

By Gordon Hansen

11:09 AM
08/16/16
Accrual Basis

Ford AmateurAstronomy Club
Balance Sheet
As of August 16, 2016

	Aug 16, 16
ASSETS	
Current Assets	
Checking/Savings	
10000 · Checking	255.29
11000 · FAAC Savings	
11100 · FAAC Club Savings	1,669.78
11200 · Equipment	2,232.48
11300 · Scholarship	165.26
Total 11000 · FAAC Savings	4,067.52
12000 · Petty Cash Account	92.49
13000 · CD's	
13100 · CD 200599272	1,064.26
13200 · CD 205196033	1,008.83
13300 · CD 89265268	1,113.18
Total 13000 · CD's	3,186.27
Total Checking/Savings	7,601.57
Total Current Assets	7,601.57
TOTAL ASSETS	7,601.57

Presidents Article

By Timothy Campbell

Continued from page 1

As many of you are already aware, some new rule changes at the Metroparks were particular challenging as they would have required that astronomers take on an unreasonable amount of legal risk. None of the clubs in the Great Lakes Association of Astronomy Clubs (GLAAC) were happy about this and there were discussions about ways to resolve the issues (which included the possibility of cancelling the event entirely.)

This year will mark the 20th anniversary of Astronomy at the Beach and nobody really wanted to cancel this event. Diane Hall and the GLAAC officers worked diligently to find a solution. The Metroparks agreed to waive the rules requiring that all volunteers sign the legal forms provided that GLAAC provide its own insurance for the event. GLAAC did find an insurer so this year's event will proceed as normal for the attending astronomers. There are no forms to be completed. All Astronomers who attend MUST be a member of a GLAAC affiliated astronomy club. If anyone wants to attend that's not a member of a club they must either join a club before the event or they can attend as a member of the public, without any equipment.

This year's Astronomy at the Beach will host Fred Espenak (a.k.a. "Mr. Eclipse") presenting on the August 2017 Great American Solar Eclipse event. Also on Saturday afternoon at 2PM, Mr. Espenak will do a talk for the astronomers & volunteers (who are usually too busy to be able to enjoy his public talks). That talk will take place in the presentation tent at the beach (not in the Nature Center as was the case in many past years).

As per usual, the Ford club will have a club table inside the pavilion. Sandra Macika has graciously offered to be our table captain. At last month's general meeting, we passed around a sign-up sheet to ask that volunteers offer to provide some relief by spending some time at the table on either night. If you don't plan to have a telescope at the event (or if you do but you have someone who will watch your scope for a while), please consider offering to sign-up for a short period of time.

If you are bringing a telescope and need to drive a vehicle down to the beach to drop off equipment, this must be done before the event begins at 6pm each night. Vehicles are not permitted on the beach during the event. Vehicles can drive back onto the beach after the event is over — please drive very cautiously as there are typically still people lingering on the beach.

One small note… the Ford Club does not host a "Beginner's Night" event of our own in September because Astronomy at the Beach effectively is that event.

Great Lakes Star Gaze:

Later in the month, on the weekend of September 29th through October 2nd is the Great Lakes Star Gaze up in Gladwin Michigan (roughly a 3 hour drive). That event is for astronomers (not a public outreach) and it's always a fun time because we have darker skies. See the website at GreatLakesStarGaze.com for information on how to register if you'd like to attend. The event is held at a campground which can accommodate either camping trailers, RVs, or tent camping. There are also several nearby hotels. If you've never been to a star party before, this is your chance.

2017 Great American Solar Eclipse:

Lastly… it is now roughly one year until the August 2017 Great American Solar Eclipse. If you haven't made plans already, you should definitely be making them now (this month). Accommodations are already becoming difficult to find. At this month's club meeting, we've decided to use the "Tech Talk" segment of the meeting to discuss our various plans and suggestions for the event… this will be a Eclipse-themed "Ask the Astronomer" open discussion.

Secretary Report

By Jessica Edwards

Main Talk – – South Carolina Star Parties – Doug Bauer

South Carolina has some very dark skies. Doug brings his astronomy expertise to the residents of a small community. Word has spread and he how as regular star parties with two local schools as well as a church. Students who would normally not have this amazing opportunity are able to have solar as well as night time viewing sessions. At John de la Howe School, volunteers of all types help the students learn skills as well as maintain the property. The star parties that happen at the local church have grown in size every year they have been held. The only set back is a single street light that has been placed near the only astronomer in the entire development.

Tech Talk – Starry Night 7 – Tim Campbell

Starry Night 7 is a wonderful piece of astronomy software that not only allows you to plan your observing sessions, it also has the ability to look at points not on the Earth's surface. Meaning you can fly thousands of light years from home and see what the night sky is like. This is very useful for many different types of presentations.

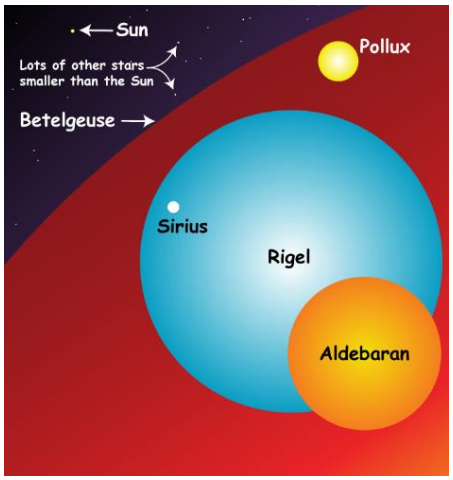
For the Young Astronomers

How does our sun compare to other stars?

Our sun is a bright, hot ball of hydrogen and helium at the center of our solar system. It is 864,000 miles (1,392,000 km) in diameter, which makes it 109 times wider than Earth. It's 10,000 degrees Fahrenheit (5,538 degrees Celsius) at the surface, and 27 million degrees Fahrenheit (14,999,982 degrees Celsius) in the core. Yikes!

Our sun is pretty impressive, but how does it compare to other stars? There are billions more stars in the Milky Way galaxy - the galaxy we call home. And there are many, many more in the rest of the universe. Is our sun special?

The Size of our sun



It turns out that our sun is an average sized star. There are bigger stars, and there are smaller stars. We have found stars that are 100 times bigger in diameter than our sun. Truly, those stars are enormous. We have also seen stars that are just one tenth the size of our sun.

Suns with friends

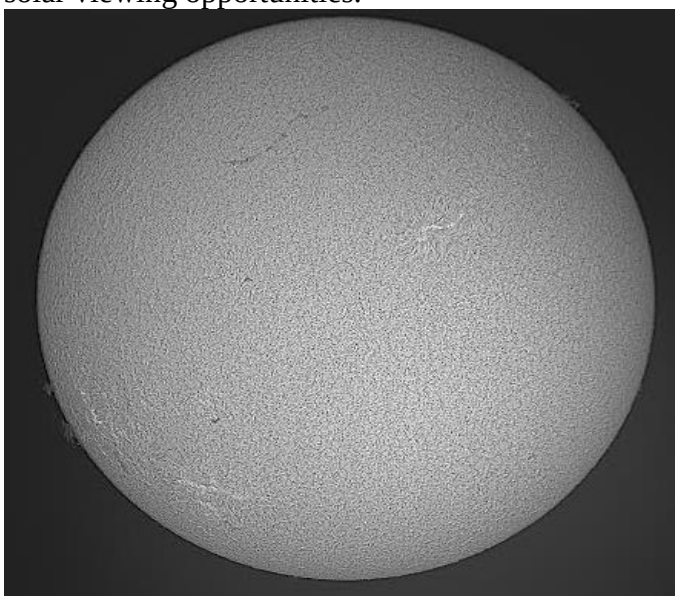
Our sun is a little unusual because it doesn't have any friends. It's just one sun surrounded by planets, asteroids, comets, and dwarf planets. But solar systems can have more than one sun. In fact, that's often the case. More than half of all stars are in multiple star systems. That means the solar system has two or more suns in it.

Can you imagine having two suns in the sky at the same time? Well, there are plenty of planets throughout the universe where that is normal.

10 Reasons why I like solar observing

By Greg Knekleian

1. It looks like we are near solar minimum with sunspots. So people might think don't buy a solar telescope during solar minimum. Because the sun will have a boring view. And this is true, but it's only true for white light astronomy that concentrates on sunspots. It's not true for HA activity, especially with a larger HA telescope. There is a lot of activity on the sun and flares exist even when there are no visible sunspots. So a nice HA telescope creates more solar viewing opportunities.

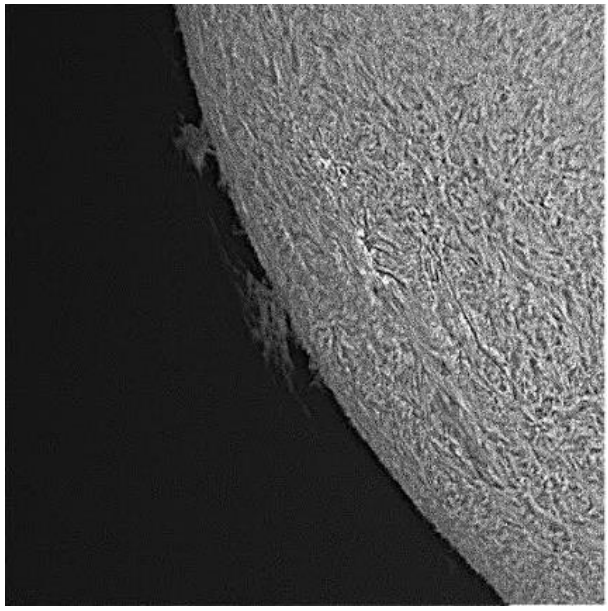


2. The moon changes as it orbits the earth. That is great for a variety of interesting views. The sun is the same size in a similar focal length telescope but it changes with solar activity each day and it's never the same. The craters don't really change much on the moon, but the sun has all kinds of changes which is like a snowflake as far as uniqueness of views. So there is always something interesting on the sun to see with HA observing.

3. In the heat of the day you don't have mosquitoes biting you in our area. They stay away while I observe the sun.

4. No worry about light pollution affecting the view.

5. You will meet more people when you observe in public because they are out and willing to chat during the day.



6. The moon isn't always visible and it rises and falls at different times of the day depending on the phase. So half the time astronomers don't even see it. They have to schedule their viewing of the moon or try to avoid it. The sun is always up each day and it's easier to schedule an observing time, clouds permitting.

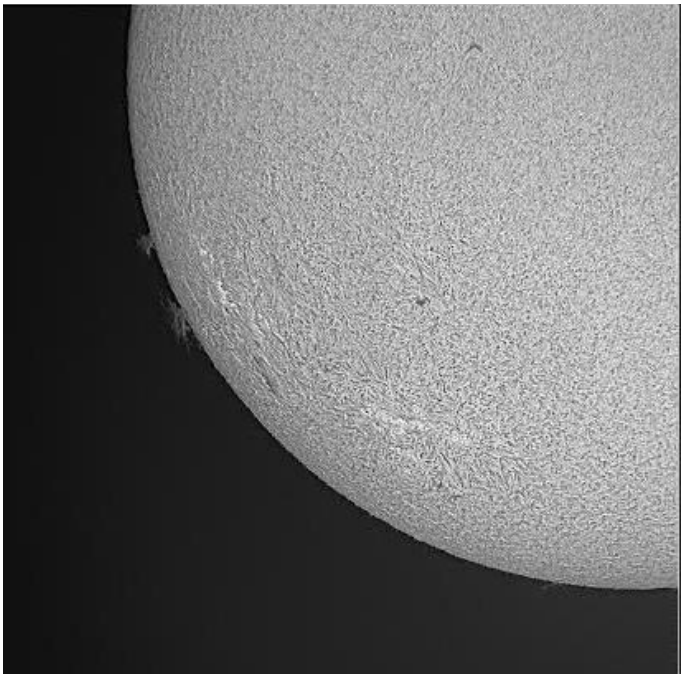
7. Vitamin D naturally. For someone who spends a lot of time indoors solar observing provides more vitamin d as our body creates this from sunlight.

8. Regarding a large HA telescope, I can see more detail through thin clouds than a smaller HA telescope and get higher power views with more magnification. That makes viewing much more interesting even with haze and thin clouds.

9. Imaging can be faster. Anyone can get a pretty decent solar image quickly with only a short movie exposure of 70 frames which is often well under 3 seconds.

10. It's easy to find the target. And you will see more planes pass the sun than most other targets, due its size.

A push to telescope is easier to setup and get quick views but clouds can be frustrating and that makes goto eq mounts more desirable for long sessions.



Are there negatives?

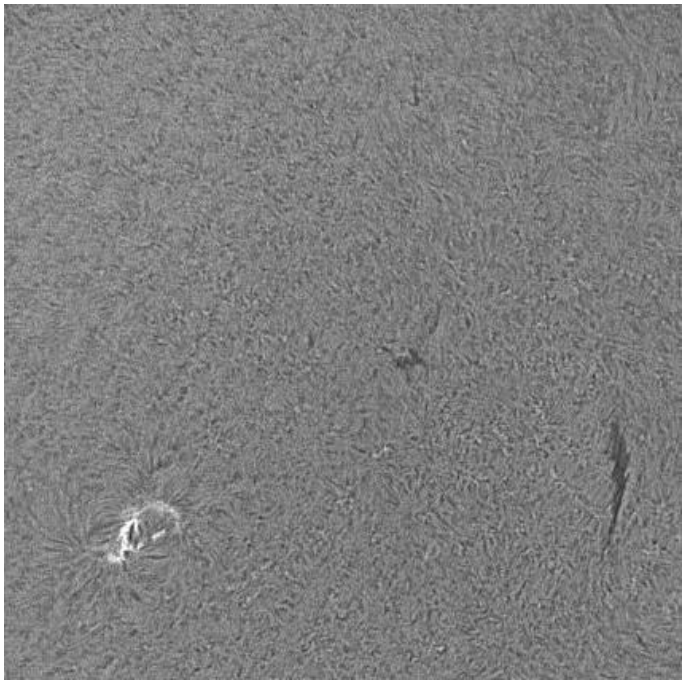
Yes be aware of sun damage from too much sunlight. It can be addictive and eat into your schedule making it difficult to do as much night time astronomy.

And it can be more difficult to do a quick polar alignment visually because the North Star isn't visible in the daytime.

Looking for a target with a manual tripod can be a strain in the eyes from a lot of sunlight.

You are more vulnerable to heat exhaustion.

And of course there is typically only one good target so once you tire of the sun there are no other things to view unless you are using a different scope and observing a moon during the day.



Lastly the price of the larger HA telescopes may be a negative if you feel the need to buy other expensive rigs for night time observing it could be a big budget hit and may give many astronomers pause. Consider this a Lunt 100mm double stack is about $8000 with the zoom eyepiece. Add a cheap tripod and $1500 point grey monochrome camera and you're looking at $10k just to look at the sun. That 10k could buy a lot of other telescope options for everything else one might want to look at.

I have an old manual tripod that cost me $1800 and it sets up in less than a minute. It's awesome for quick solar astronomy but that makes my observing costs for solar nearly $12k without an eq tracking tripod.

FAAC Schedule of Events 2016				
Month	**Event**	**Date**	**Start Time**	**Location**
September	Astronomy At The Beach	Friday 9th, Saturday 10th	5pm	Kensington Metro park
October	Beginner Night	Saturday 8th	8pm	Lake Eire Metro park
October	Beginner Night	Saturday 22nd	7pm	Maybury State Park

Astro Imaging SIG Events

By 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 September 8th**. The meeting room location – HFC Admin. Services and Conference Center (same building), Berry Amphitheater Auditorium.
Topics invited. Pizza served

FAAC Equipment Holders Report

By Dennis Salliotte

FAAC Equipment Report 7/21/16

Item	Currently Held By:	Date Last Verified
Telescopes		
4" Dobsonian (Harold's donation)	George Korody	1/7/16
Presentation Tools		
Projector (older)	Jim Frisbie	3/22/16
Projection Screen 8'	Bob MacFarland	6/15/16
Speaker System w/wireless mic	Bob MacFarland	6/15/16
Bullhorn	George Korody	1/7/16
DVD Player	Jim Frisbie	3/22/16
Projection Screen 6'	Mike Dolsen	3/1916
Projector, ViewSonic	Gordon Hansen	7/21/16
Demonstration Tools		
Weight On Planets Scale	George Korody	1/7/16
Lunar Phase Kit	Bob MacFarland	6/15/16

100 ft Scale Model Solar System Kit	Bob MacFarland	6/15/16
Display Items		
Astronomy Event Sign (3' X 6')	Gordon Hansen	7/21/16
PVC Display Board - Folding	Sandra Macika	1/8/16
Banner – Small (24" X 32")	George Korody	1/7/16
Banner – Medium (24" X 72")	Sandra Macika	1/8/16
Banner – Large (32" X 16')	George Korody	1/8/16
Tri-Fold Presentation Boards	Don Klaser	1/8/16
Tri-Fold Poster Board (Early Club Photos)	George Korody	1/7/16
Other		
Canopy (10' X 10')	Tim Campbell	7/21/16
Equipment Etching Tool	Greg Ozimek	1/10/16
Pop Cooler	Michael Dolsen	6/22/16
EQUIPMENT KITS	**CARETAKER**	
Telescopes		
TK3 Celstrn 130 Newt Goto mount	Liam Finn	7/20/16
TK4 Clstrn 90 Refrctr w/man mount	Liam Finn	7/20/16
TK5 4 ½ " Reflector, on Fitz GEM mount	Bob MacFarland	6/15/16
TK6 8" Orion 8XTi Dobsonian	Jennifer Monske CARETAKERSHIP IS AVAILABLE	4/17/16
TK1 Coronado PST solar scope w/double stack, Meade Autostar Goto mount & tripod and accessories	John McGill	1/9/16
Binoculars		
BK3 15x70 binocs, monopod mount	Bob MacFarland	6/15/16
BK4 20x80 binocs,altaz goto mount	Sandra Macika	1/8/16
BK5 25x70 binocs w/tripod adaptor	Tim Dey	6/15/16
Eyepiece Kit		
EPK1 Eyepieces, filters & accessories	Liam Finn	7/20/16
Other		
TA Sky Quality Meter	Syed Saifullah	4/26/16

TA Sky Atlas 2000.0	Tim Dey	6/15/16
TA Orion telescope binoviewer	Liam Finn	7/20/16
Lincoln Park Observatory		
LPO Celestron binoviewer #93691	Tim Dey	6/15/16
LPO Celestron 2X 1.25” Barlow	Tim Dey	6/15/16
Imaging SIG		
C1 Celestron NexImage Solar System Imager model #93712	Gordon Hansen	7/21/16
C2 Meade Deep Sky Imager PRO III w/AutoStar Suite	Gordon Hansen	7/21/16
C3 Orion StarShoot Deep Space Video Camera NTSC #52185 w/video capture device #52178	Gordon Hansen	7/21/16
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	6/16/16
C5 Orion StarShoot Deep Space Video Camera II #52195 AND Orion StarShoot iPhone Control for Deep Space Video Camera II #52195	Gordon Hansen	7/21/16
C6 Canon 60 DA and accessories	Tim Dey	7/8/2016
CA2 Celestron 1.25” to T-Adapter(male thread) Model #93625	Gordon Hansen	7/21/16
CA3 Canon EOS deluxe astrophoto kit FOR Canon bayonet T-thread adapter and variable 1.25” extender	Gordon Hansen	7/21/16
CA4 Orion StarShoot LCD-DVR #58125 2.5” LCD screen	Gordon Hansen	7/21/16
CA5 Celestron Canon EOS T-ring adapter #93419	Gordon Hansen	7/21/16
Special Event Use Only-Not Available For Loan Out		

TK2 Meade 8" ETX-LS-ACF w/tripod, voice assist, computerized GPS plus MANY (35+) accessories	Tim Dey	6/15/16
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	7/21/16
BK2 Zhumell 25x100 binoculars, hard case & Zhumell TRH-16 tripod w/soft fabric bag	Sandra Macika	1/8/16
TAK1 Night Vision Intensification binocular unit	George Korody	1/7/16
Dennis Salliotte equipment@fordastronomyclub.com		

STAR STUFF

This Newsletter is published eleven times each year by:
FORD AMATEUR ASTRONOMY CLUB P.O. Box 7527 Dearborn MI 48121-7527

PRESIDENT: Tim Campbell
VICE PRESIDENT: Tim Dey
SECRETARY: Jessica Edwards
TREASURER: Gordon Hansen
WEBMASTER: Greg Ozimek
NEWSLETTER EDITOR: Liam Finn

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. You may also 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 month's issue.

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

Editors Notes

Any members who wish to provide input on the layout and design of the Newsletter please contact me.