



Star Stuff

Ford Amateur Astronomy Club Newsletter

Volume 26, Number 5

June 2016

Hubble's bubble lights up the interstellar rubble

By Ethan Siegel

When isolated stars like our Sun reach the end of their lives, they're expected to blow off their outer layers in a roughly spherical configuration: a planetary nebula. But the most spectacular bubbles don't come from gas-and-plasma getting expelled into otherwise empty space, but from young, hot stars whose radiation pushes against the gaseous nebulae in which they were born. While most of our Sun's energy is found in the visible part of the spectrum, more massive stars burn at hotter temperatures, producing more ionizing, ultraviolet light, and also at higher luminosities. A star some 40-45 times the mass of the Sun, for example, might emit energy at a rate hundreds of thousands of times as great as our own star.

The Bubble Nebula, discovered in 1787 by William Herschel, is perhaps the classic example of this phenomenon. At a distance of 7,100 light years away in the constellation of Cassiopeia, a molecular gas cloud is actively forming stars, including the massive O-class star BD+60 2522, which itself is a magnitude +8.7 star despite its great distance and its presence in a dusty region of space. Shining with a temperature of 37,500 K and a luminosity nearly 400,000 times that of our Sun, it ionizes and evaporates off all the molecular material within a sphere 7 light years in diameter. The bubble structure itself, when viewed from a dark sky location, can be seen through an amateur telescope with an aperture as small as 8" (20 cm).

Continued on Page 2

Presidents Article

By Timothy Campbell

The club relies on volunteers for everything we do. Among all of those who keep the club running and perform outreach activities, we identify one person whom we believe stands out and we present that person with the Sirius Award. Often this is a person who has been contributing their time for many years. This year that person is Greg Ozimek.



Greg is probably most well-known for bringing pizza to the club meetings and running the website. Greg also actively participates at board meetings, serves on the election/nominating committee, does the speaker search for the annual banquet, and collaborated with the Astronomy for Everyone team to get all of the episodes posted online. Congratulations, Greg!

Continued on page 4

Continued from page 1

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As viewed by Hubble, the thickness of the bubble wall is both apparent and spectacular. A star as massive as the one creating this bubble emits stellar winds at approximately 1700 km/s, or 0.6% the speed of light. As those winds slam into the material in the interstellar medium, they push it outwards. The bubble itself appears off-center from the star due to the asymmetry of the surrounding interstellar medium with a greater density of cold gas on the "short" side than on the longer one. The blue color is due to the emission from partially ionized oxygen atoms, while the cooler yellow color highlights the dual presence of hydrogen (red) and nitrogen (green).

The star itself at the core of the nebula is currently fusing helium at its center. It is expected to live only another 10 million years or so before dying in a spectacular Type II supernova explosion.



Images credit: an artist's concept of the JPSS-2 Satellite for NOAA and NASA by Orbital ATK (top); complete temperature map of the world from NOAA's National Weather Service (bottom).

FAAC Speaker Schedule

June 23	Presentation	Dr. Misconi	An Immigrant's Journey into the Cosmos
	Tech Talk	Tim Dey	Meade Light Switch
July 28	Presentation	Doug Bauer	South Carolina Star Parties
	Tech Talk	Tim Campbell	Starry Night 7

Treasurers Report

June 2016

By Gordon Hansen

4:46 PM
06/14/16
Accrual Basis

Ford Amateur Astronomy Club Balance Sheet As of June 14, 2016 Jun 14, 16

ASSETS

Current Assets

Checking/Savings

10000 · Checking	255.29
11000 · FAAC Savings	
11100 · FAAC Club Savings	2,203.88
11200 · Equipment	2,197.48
11300 · Scholarship	140.26
Total 11000 · FAAC Savings	4,541.62
12000 · Petty Cash Account	108.19
13000 · CD's	
13100 · CD 200599272	1,063.73
13200 · CD 205196033	1,008.33
13300 · CD 89265268	1,112.49
Total 13000 · CD's	3,184.55

Total Checking/Savings 8,089.65

Total Current Assets 8,089.65

TOTAL ASSETS 8,089.65

LIABILITIES & EQUITY

Equity

30000 · Opening Balance Equity	8,890.38
32000 · Retained Earnings	5,573.02
Net Income	-6,373.75

Total Equity 8,089.65

TOTAL LIABILITIES & EQUITY 8,089.65

Presidents Article

By Timothy Campbell

Continued from page 1

It's hard to believe it's already June. As you read this, it's probably the summer solstice, and from here on the days will be getting shorter and that means the nights will be getting longer (Yay! More minutes of stars.) It also means it's time to start planning the activities for the last half of the year including the club picnic in August, Astronomy at the Beach in September, Eerie Skies in October, and the candidate search for the January election of officers. While Tim Dey and Jessica Edwards are not term-limited, Gordon Hansen and I are both term-limited. That means we must replace at least two officers this year. Please carefully consider if you would be willing to serve on the board.

Secretary Report

By Jessica Edwards

Member Observations and What's Up

Many members enjoyed watching the Mercury Transit. Several schools were involved so it was a wonderful outreach event. Three planets (Mars, Saturn and Jupiter) are visible this month along with many galaxies to be hunted down.

Tech Talk

The club owns a Cannon 60D camera that can be used for imaging. Much of the hardware and some software is included for any member that want to use this camera to get started on some Astro Imaging.

Main talk – Realistic Interstellar Travel by Les Johnson

Everyone who has spent some time looking up at the sky has wondered what it would be like to travel to distant stars and planets. Our favorite sci-fi shows have inspired the imaginations of many people to get into a variety of science fields and led the

speaker to explore the possibilities of realistic travel to other stars and planets. Many of the stars in our galaxy have planets. In 1992 we knew of only 9, today, we know of more than 2000. The chemicals we use now do not have the energy density to get us to nearby stars in a reasonable amount of time. Small scale experiments have been conducted to see if Nuclear Pulse Propulsion is a method that could be used. Exploding nuclear bombs behind a craft to propel it to 2-5% of the speed of light would get us to Alpha Centauri in about 140 years. Harnessing the same energy that powers the sun, fusion, gets us there in about 150 years. Even using anti-matter as a fuel takes 150 years for the trip, but is also creates a lot of engineering problems with the fuel. Any contact with normal matter causes the conversion of all the mass to energy and at about \$100 trillion per gram, the cost to generate the 100-1000 tons needed to get to Alpha Centauri is prohibitively expensive.

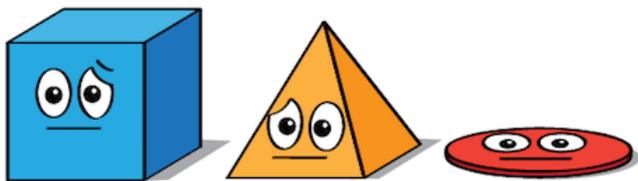
If matter fueled means of propulsion are not good ways to travel interstellar distances, what can be used? Solar sails provide an intriguing possibility. Using radiation pressure as “fuel” large reflecting films can be used to power our dreams of traveling to the stars. Using earth based lasers and space based focusing lenses to assist in the sails, speeds of 10% of the speed of light are predicted. Missions to asteroids and other nearby objects are planned as stepping stones to the stars. Several individuals are personally financing solar sail projects. Using lasers and probes the size of postage stamps, they are planning to accelerate to 20% of the speed of light in just 20 minutes with the assistance of earth based lasers (an acceleration of 60,000gs). Much more research and engineering are needed with all these projects, but they are the beginning of amazing adventures into the void.

For the Young Astronomers

Why are planets round?

Big, small, but all round

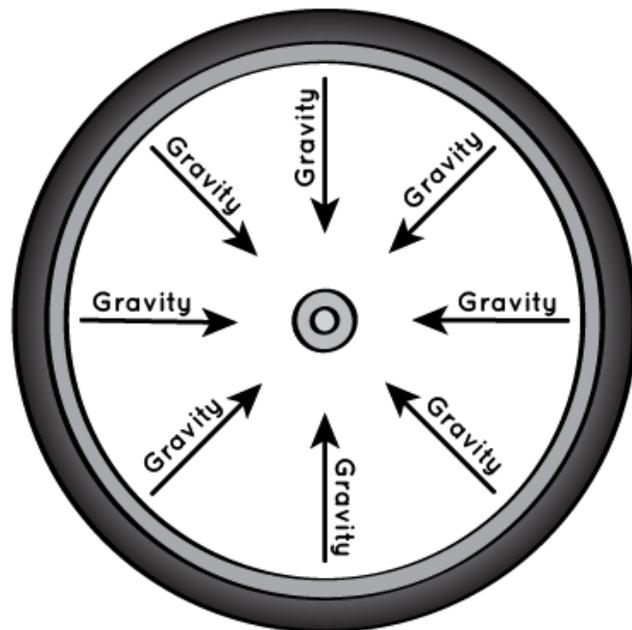
The eight planets in our solar system differ in lots of ways. They are different sizes. They are different distances from the sun. Some are small and rocky, and others are big and gassy. But they're all nice and round. Why is that? Why aren't they shaped like cubes, pyramids, or discs?



Planets form when material in space starts to bump and clump together. After a while it has enough stuff to have a good amount of gravity. That's the force that holds stuff together in space. When a forming planet is big enough, it starts to clear its path around the star it orbits. It uses its gravity to snag bits of space stuff.



A planet's gravity pulls equally from all sides. Gravity pulls from the center to the edges like the spokes of a bicycle wheel. This makes the overall shape of a planet a sphere, which is a three-dimensional circle.



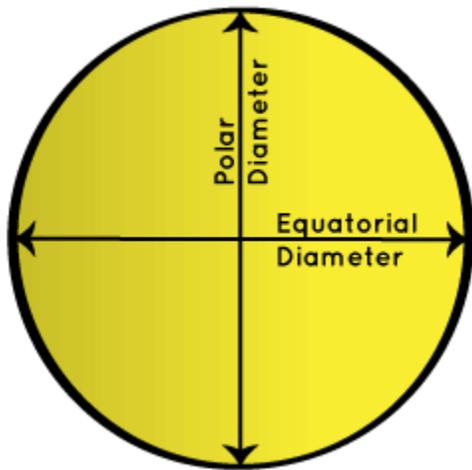
Are they all perfect, though?

While all the planets in our solar system are nice and round, some are rounder than others. Mercury and Venus are the roundest of all. They are nearly perfect spheres, like marbles.

But some planets aren't quite so perfectly round.

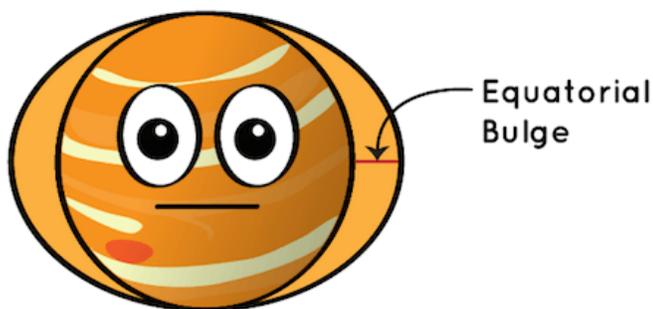
Saturn and Jupiter are bit thicker in the middle. As they spin around, they bulge out along the equator. Why does that happen? When something spins, like a planet as it rotates, things on the outer edge have to move faster than things on the inside to keep up. This is true for anything that spins, like a wheel, a DVD, or a fan. Things along the edge have to travel the farthest and fastest.

Continued on page 6



Along the equator of a planet, a circle half way between the north and south poles, gravity is holding the edges in but, as it spins, stuff wants to spin out like mud flying off a tire. Saturn and Jupiter are really big and spinning really fast but gravity still manages to hold them together. That's why they bulge in the middle. We call the extra width the equatorial bulge.

Saturn bulges the most of all the planets in our solar system. If you compare the diameter from pole to pole to the diameter along the equator, it's not the same. Saturn is 10.7% thicker around the middle. Jupiter is 6.9% thicker around the middle.

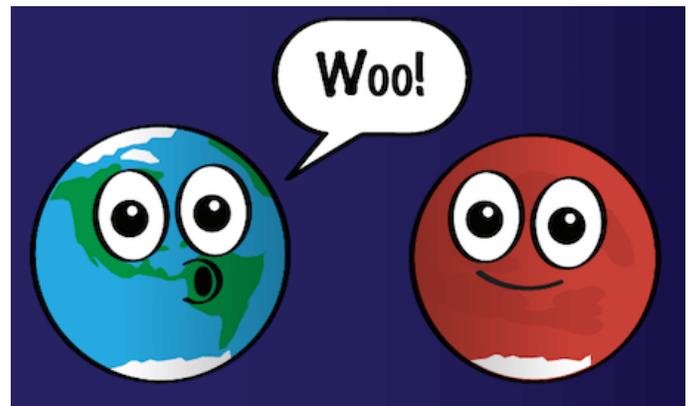


Instead of being perfectly round like marbles, they are like basketballs squished down while someone sits on them.

What about the other planets?

Earth and Mars are small and don't spin around as fast as the gas giants. They aren't perfect spheres, but they are rounder than Saturn and Jupiter. Earth is 0.3% thicker in the middle, and Mars is 0.6% thicker

in the middle. Since they're not even one whole percentage point thicker in the middle, it's safe to say they're very round.



As for Uranus and Neptune, they're in between. Uranus is 2.3% thicker in the middle. Neptune is 1.7% thicker. They're not perfectly round, but they're pretty close.

Feel the forces from spinning

Do you want to know what it's like to be a spinning planet? You can feel it when you spin around in place. First, make sure there are no obstacles around that you might bump into. Then either while standing, or in a spinner chair, spin around in circles. Hold your arms close to your body, then extend your arms out. Move your arms in and out and feel the difference. When your arms are outstretched, your hands have to move faster than your shoulders to keep up, so you'll feel more force on them.

Close up- Slice of the Sun

By Greg Knekleian

Here's a couple photos, one being processed on the Ipad to add some color. These were taken though a Lunt 100mm DS HA telescope using a 5 megapixel Point Grey Grasshopper 3 camera.

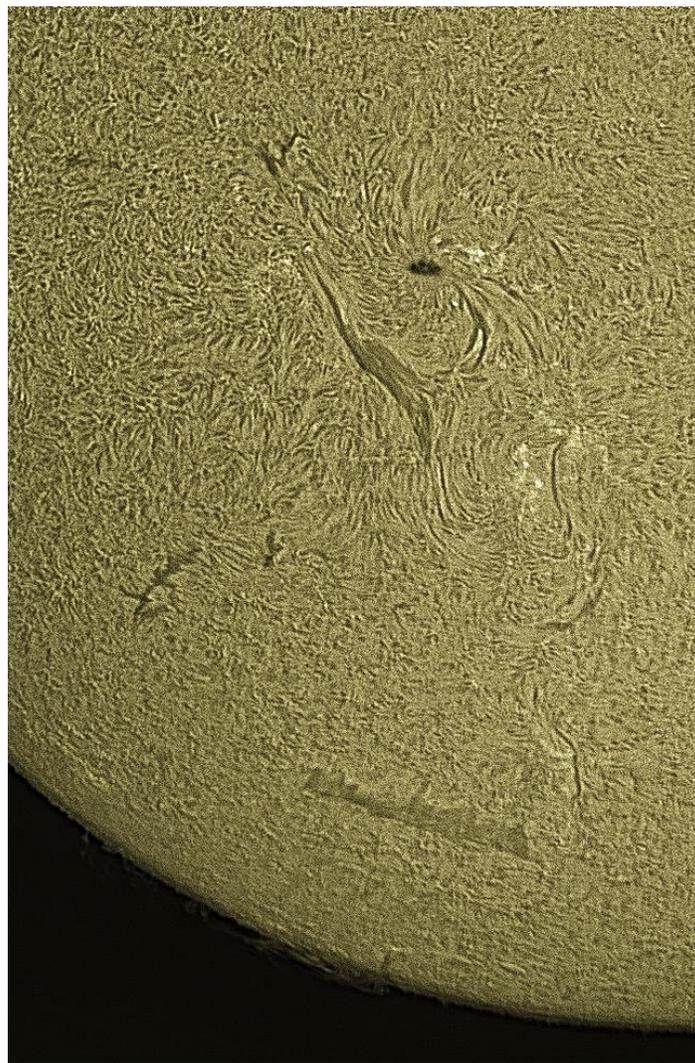
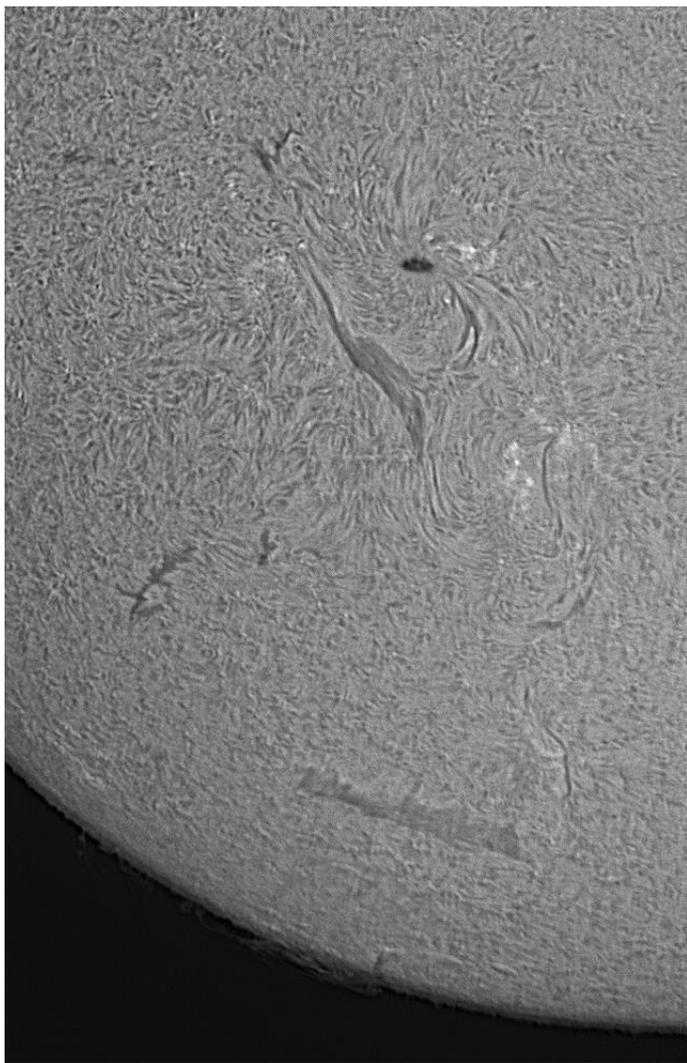
Images was stacked and sharpened with free PC software: Autostakkert and Registax 6. Post processing for color was done using Photoshop Express App on the iphone and EDIT on the iphone to crop the photo edges slightly.

The Lunt 100mm DS telescope is a wonderful telescope. The visual views show more detail than is shown on public HA websites from major observatories as the "live" image.

<http://halpha.nso.edu/> - Gong HA site can't compare to the Lunt's visual image.

This is likely because those images are screen captures from high resolution cameras but are not stacked images that are processed. Stacking an AVI movie file from a high resolution monochrome camera is the way to get really nice photos of the sun from a HA telescope without a lot of post processing effort.

I can use simple apps on the Ipad for most of the quick work rather than Photoshop. After Registax is used, I use Filterstorm, Photoshop Express and Edit most of the time. These three iphone/ipad apps cost less than \$20 total and sometimes I may use another iphone app - called Enlight as well.



Lincoln Park Mi, HJRO Update

By Greg Knekleian

This spring we have opened up HJRO perhaps a half a dozen times. Once in a while I end up opening it up with almost no notice, because it's clear out and I have a moment to get over there perhaps doing a planetary test. It's difficult to stay away from the observatory when Mars is near opposition and Saturn is not far behind. Mars and Saturn have been the main targets for many of the observing nights with Jupiter being viewed and photographed as well. Brian Kutcher had me open HJRO one night and no one else showed up. Brian happily imaged Saturn and Mars without interruption. Tim Dey, Tim Campbell, Art Parent, Brian Kutcher and Rick Arzadon are the ones who seem to be showing up the most over the last half a dozen openings of the observatory.

We had a dome motor start to act up and freeze causing us to have to actually push the dome around one night by hand when looking for targets. The motor was fixed however and the school system picked up the tab.

We had a 180 student's do the Mercury transit event, and that was discussed in last month's Star Stuff so I won't bore you with further rehashing of that outing.

At the Mercury transit I was able to use my Lunt 100mm solar telescope. I've been so thrilled to look at the sun on any sunny day, that it has taken up plenty of time and energy and made night viewing at HJRO challenging.

The grasshopper 3 camera I purchased for my solar images should work well as a planetary camera at HJRO when I take it out there. I've only done some test planetary images in black and white and these during poor seeing. I'm looking forward to adding color filters to the camera and doing color planetary imaging with this new camera at HJRO, when the weather and my schedule permit. It should be fun and challenging.

I happened upon Tim Campbell and Tim Dey late this month as they were putting a new battery and new star model in the telescope mount. For a while we had some really bad pointing errors, but that was because we had a mix up with the EST instead of UTC time being entered. That was resolved and we can debug and add more stars to the model as we work the bugs out of re-modeling the telescope setup.

I didn't take any really nice photos of the observatory during the past few months, so I'm going to include a photo of my new Lunt telescope below. I could set this up on an EQ tripod, but found that I'm able to use a nice Alt Azimuth video tripod and set the telescope up in 5 minutes rather than 20. The imaging of the sun doesn't require many frames and I'm able to get about 70 frames in a second or so. The EQ mount is pulled out for special viewing sessions.



FAAC Schedule of Events 2016				
Month	Event	Date	Start Time	Location
July	Beginner Night	Saturday 9th	8pm	Island Lake
August	Club Picnic	Saturday 13th	8pm	Island Lake
September	Astronomy At The Beach	Friday 9th, Saturday 10th	5pm	Kensington Metro park
October	Beginner Night	Saturday 8th	8pm	Lake Eire Metro 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 **July 14th**. The meeting room location – HFCC Admin. Services and Conference Center (same building), Berry Amphitheater Auditorium.

Topics invited. Pizza served

FAAC Equipment Holders Report

By Dennis Salliotte

FAAC Equipment Report 6/16/16

<u>Item</u>	<u>Currently Held By:</u>	<u>Date Last Verified</u>
<u>Telescopes</u>		
4" Dobsonian (Harold's donation)	George Korody	1/7/16
<u>Presentation Tools</u>		
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	3/19/16
Projector, ViewSonic	Gordon Hansen	6/16/16
<u>Demonstration Tools</u>		
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

<u>Display Items</u>		
Astronomy Event Sign (3' X 6')	Gordon Hansen	6/16/16
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
<u>Other</u>		
Canopy (10' X 10')	Tim Campbell	2/15/16
Equipment Etching Tool	Greg Ozimek	1/10/16
Pop Cooler	Michael Dolsen	3/19/16
<u>EQUIPMENT KITS</u>	<u>CARETAKER</u>	
<u>Telescopes</u>		
TK3 Celstrn 130 Newt Goto mount	Liam Finn	2/16/16
TK4 Clstrn 90 Refrctr w/man mount	Liam Finn	2/16/16
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
<u>Binoculars</u>		
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
<u>Eyepiece Kit</u>		
EPK1 Eyepieces, filters & accesories	Liam Finn	2/16/16
<u>Other</u>		
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	2/16/16

<u>Lincoln Park Observatory</u>		
LPO Celestron binoviewer #93691	Tim Dey	6/15/16
LPO Celestron 2X 1.25" Barlow	Tim Dey	6/15/16
<u>Imaging SIG</u>		
C1 Celestron NexImage Solar System Imager model #93712	Gordon Hansen	6/16/16
C2 Meade Deep Sky Imager PRO III w/AutoStar Suite	Gordon Hansen	6/16/16
C3 Orion StarShoot Deep Space Video Camera NTSC #52185 w/video capture device #52178	Gordon Hansen	6/16/16
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	6/16/16
CA1 Rigel Systems Spectroscope	Gordon Hansen	6/16/16
CA2 Celestron 1.25" to T-Adapter(male thread) Model #93625	Gordon Hansen	6/16/16
CA3 Canon EOS deluxe astrophoto kit FOR Canon bayonet T-thread adapter and variable 1.25" extender	Gordon Hansen	6/16/16
CA4 Orion StarShoot LCD-DVR #58125 2.5" LCD screen	Gordon Hansen	6/16/16
CA5 Celestron Canon EOS T-ring adapter #93419	Gordon Hansen	6/16/16
<u>Special Event Use Only- Not Available For Loan Out</u>		
TK2 Meade 8" ETX-LS-ACF w/tripod, voice assist,	Tim Dey	6/15/16

computerized GPS plus MANY (35+) accessories		
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	1/10/16
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.