The Warren Astronomical Society

Founded: 1961

P.O. BOX 1505
WARREN, MICHIGAN 48090-1505

http://www.warrenastro.org

The JAXA Akatsuki spacecraft is in orbit around Venus!

Space travel has its hazards, and 5 years ago Japanese spacecraft called Akatsuki encountered one: its main propulsion system failed, and it zipped past its orbital insertion point around the planet Venus. But on December 6th, engineers used a smaller set of thrusters on the spacecraft to nudge it into being captured by Venus’ gravity.

At the time I’m writing this, JAXA engineers state that the attitude control burn operated as scheduled, and the spacecraft is in good health. The orbit of the spacecraft is being measured and calculated— it will take a few days before the operation result will be announced.

Bob Trembley
The Gravity Well
(Musings of the Editor)

I got a lot of positive response to my “Exploring the Solar System” lecture - thanks everyone! I split the lecture in two, and gave them to Connie’s astronomy class the week after I gave it to the WAS. I’ve also just started a new series of posts based on the lecture on the VOF Blog.

The two things that got a “wooh!” from the students were a close-up of Jupiter’s moon Callisto, and a slide mentioning the discovery of thousands of exoplanets.

This will be my last issue of the W.A.S.P. (board members have a 2 year limit); I was told frequently by members that they really liked it, and read it cover to cover. Wow! I learned a lot during the 2 years I produced the newsletter; layout often seemed like fitting a jigsaw puzzle together. I would get the major portions done, then fill empty spaces with whatever was available—often grabbing the latest images from the Solar Dynamics Observatory, and current space missions, or by creating them myself.

I was very happy to see an increase in the amount of member-submitted pictures and articles over my term—a trend I hope to see continue. THANK YOU to everyone who contributed to the W.A.S.P.!

On a personal front, I webmaster and write astronomy and space science articles for the Catholic Astronomer—the blog of the Vatican Observatory Foundation: http://www.vofoundation.org/blog/. (And we would LOVE more followers!) Br. Guy has taken some old journal entries he’d written years ago in The Tablet, snazzed them up with images and videos, and reposted them in a new series called Across the Universe. Br. Guy also wants to expand the VOF site and add astronomy educational materials—just what the Education S.I.G. guy wants to hear!

On Nov. 30th, I attended the ESA European Service Module media event at the NASA Glenn Research Facility’s Plum Brook Station near Sandusky Ohio. This is the first time I’ve attended an event like this “as part of the media.” I was live-tweeting during the event, and I learned a bit, watching how experienced media people actually did things...

We got to hear a panel of several NASA/Lockheed/ESA reps and a congresswoman talk about the international cooperation it took to produce the Service Module for the Orion Spacecraft. There was a question and answer period afterwards, and the moderator had to coax questions from the audience; I asked about how the radiation environment was being handled, and … I could not help myself—I asked them how many of their engineers played Kerbal Space Program. (KSP was actually the topic of conversation with me another attendee on the bus trip back across the facility.)

Media folk got to talk-with/interview all the reps on the panel, then we got a tour of the testing facility, and saw many different ways that spacecraft components are abused subjected to forces they will encounter during launch and flying through the atmosphere—this was quite the treat for me!

I wrote about the media event on the VOF blog here: http://www.vofoundation.org/blog/travelogue-orion-spacecraft-esa-european-service-module-media-event-at-nasa-glenns-plum-brook-station/

Bob Trembley
Friends and WAS members:

This is my final Field of View. It has been an honor and a pleasure to be your president. I'm sad to be leaving a great board. But I'm proud of what my boards have been able to accomplish, building upon the work of many previous boards. I'm excited to be getting some time back to work on my own observing and to enjoy the practice of astronomy without the responsibility of planning. I'm above all happy to be leaving the administration of the club in the caring, capable hands of a 2016 board featuring our first female president and two first-time board members.

I am very proud of the work we've done. I was lucky to become president at a time when many important long-term efforts were coming to fruition:

- Our 501(c)(3) status, in the works since my first term as treasurer, was finally approved this March after one last major work drive last year.
- The Kalinowski-Khula Telescope at Stargate was completed by the Stargate crew led by Joe, Riyad, and Andy.
- We established a scholarship for students at Macomb Community College, something we've been looking to do for a long while.
- Our website still ain't pretty, but it works adequately on mobile devices now.
- Our partnerships with local educational institutions, service groups of all ages, and local parks continue to mature and blossom.

I'm also proud of this: new members continue to join the club and bring their skills and perspectives to our events. While nobody can replace the fixtures of the club who have passed away in recent years, we remain strong and healthy largely thanks to new members becoming an active part of the life of the club. I've been most pleased at the number of young people contributing. Kate Golden and Parker Huellmantel and their friends and family have been a tremendous addition to our outreach ranks.

Not that long-time members have slacked off. Look through the outreach reports over the last year and you will see many WAS mainstays month after month. (I’m afraid to list them all, because I’m already blowing Bob’s space limits, and I fear I’ll leave somebody out.) Speaking of the young, the continued service of Brian Berta and Joseph Lico has been really heartening, enhancing Stargate with their Eagle Scout projects and recruiting their troop mates to do the same. Long-time member Mark Kedzior led an effort to launch a telescope lending program at the Grosse Pointe Library system. We’ve had welcome outreach returns from Stephen and Joyce Uitti and Therese Oldani.

It wouldn't be right to cover the new board without recognizing the service of my board: Charles Dezelah was an amazing secretary and AlCor, full of ideas and the work ethic to make them real. From far-off Boston, he still contributes my favorite feature in the WASP. Angelo DiDonato was a terrific outreach coordinator, and even though he couldn't serve a second term this year, he's continued to assist with at least half of our outreach events. Finally, Dr. Dale Partin has been a superb first vice-president, covering for me whenever I couldn't be here, helping push through the last of the 501(c)(3) paperwork, arranging for absolutely world-class academic speakers (but not at the expense of WAS members presenting), and bringing a thoughtful, rational, and
wise perspective to every board discussion.
Most of the board is continuing on into 2016: Diane Hall, who has served as outreach director on two different boards and as first vice-president, is our first female president! Jeff MacLeod, after a stellar partial term as secretary, is taking the reins at Stargate as second VP. (Nb. figurative reins only, due to the ban on horses.) Joe Tocco is putting down the scopes and taking up the ledger as our treasurer. Bob Trembley, practically an astronomical education professional already, is making it official as our outreach director. And Dale Thieme, the greatest treasurer of them all, is taking his years moonlighting as club historian and WASP scanmeister into a new gig as publications director.
The new board has two first-time board members, both veteran WAS members and frequent outreach volunteers: notable up-and-coming astrophotographer Ralph DeCew is jumping on board as first vice-president. Biker, sailor, and scholar Dennis David, one of the coolest people in the club, is casting off on a new voyage as secretary. I wish them both, with all the board, two happy, successful, and fulfilling terms on the board.
I’m going to miss helping to direct the Society, no matter how much I look forward to practicing astronomy in my spare time instead of doing WAS work. I will even miss having an excuse for dumping my thoughts on all of you every month, though I’m sure Bob T won’t miss waiting for me to do it. If I might, in closing this last rumination, paraphrase antiquity like my esteemed predecessor President Ross:
Though, in reviewing the incidents of my administration, I am unconscious of intentional error, I am nevertheless too sensible of my defects not to think it probable that I may have committed many errors. Whatever they may be, I fervently beseech my successors to avert or mitigate the evils to which they may tend. I shall also carry with me the hope that the Society will never cease to view them with indulgence; and that, after six years of my life dedicated to its service with an upright zeal, the faults of incompetent abilities will be consigned to oblivion, as myself must soon be to the mansions of... er, work.

Good night, good luck, and clear skies.
- Jonathan Kade

Ceres’ Bright Spots
No longer “Mysterious”

Ceres has more than 130 bright areas—most of which are associated with impact craters. The bright material in Ceres’ Occator Crater is consistent with a type of magnesium sulfate called \textit{hexahydrite}. On Earth, a different type of magnesium sulfate will be familiar to you as Epsom salt.
Andreas Nathues at Max Planck Institute for Solar System Research, Göttingen, Germany \textit{states}: "The global nature of Ceres’ bright spots suggests that this world has a subsurface layer that contains briny water-ice."

- Bob Trembley
**Society Meeting Times**

Astronomy presentations and lectures twice each month at **7:30 PM**:

- **First Monday** at Cranbrook Institute of Science.
- **Third Thursday** at Macomb Community College - South Campus Building J (Library)

**Snack Volunteer Schedule**

Jan. 4....... Cranbrook ..... Gary Ross
Jan. 21...... Macomb ...... Mark Kedzior
Feb. 1 ...... Cranbrook ..... Joe Tocco
Feb. 18 ..... Macomb ...... Gerald Voorheis
Mar. 7 ...... Cranbrook ..... Glenn Wilkins
Mar. 17 ..... Macomb ...... John Horton
Apr. 4...... Cranbrook ..... Jonathan Kade & Diane Hall
Apr. 21 ..... Macomb ....... Dale Partin
May 2........ Cranbrook ..... Ralph DeCew
May 19...... Macomb ...... Bob Berta
June 6 ...... Cranbrook ..... Ken Bertin
June 16..... Macomb ...... Jeff MacLeod

If you are unable to bring the snacks on your scheduled day, or if you need to reschedule, please email the board at board@warrenastro.org as soon as you are able so that other arrangements can be made.

**Discussion Group Meeting**

Grab some snacks, come on over, and talk astronomy, space news, and whatnot!

The WAS Discussion Group meetings take place at the home of Gary and Patty Gathen, from 8 - 11 PM, on the fourth Thursday of the month, from January-October. Different dates are scheduled for November and December due to the holidays. The Gathens live at 21 Elm Park Blvd, in Pleasant Ridge—three blocks south of I-696, about half a block west of Woodward Ave.

The agenda is generally centered around discussions of science and astronomy topics. Soft drinks are provided,

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At every meeting of the Warren Astronomical Society, members or guest lecturers give astronomy presentations. Here is a list of scheduled presentations for the next few months:

**The Astronomy Year in Review**

Marty Kunz

In a year in which we saw our first clear pictures of Pluto and its moons, Marty will show the enormous breadth of discovery that spanned 2015. *Come and enjoy!*

Marty has been a member of WAS for over 30 years, and has served in every officer position. He has worked at Cranbrook Institute of Science in the Astronomy Department for over 25 years. He hosts two live internet radio shows every week on astronomy.fm, reaching over 30,000 listeners per month.
Sky Quality Meter Device Compared to Dark Sky Meter App

Jon Blum

Jon will discuss the advantages and disadvantages of measuring how dark the sky is using the stand-alone meter versus making that measurement with an app on his smart phone.

Jon has been a member of WAS for 11 years. Although he has been interested in astronomy since childhood, he started seriously into the astronomy hobby when he received a telescope as a gift from his children when he retired from his career as a dermatologist. He originally came to WAS events to learn to use his telescope, then to better understand the objects seen in his telescope. But now he just comes to socialize, so he appointed himself as the welcoming committee for new members. Jon is a former WAS president and vice president. This is Jon's 15th WAS presentation.

In the Sky (short)

Diane Hall discusses what’s to watch for in the heavens this month!

Comet Catalina

This photo of Comet Catalina was taken by Fritz Helmut Hemmerich and featured on the on 7 Dec. 2015 Astronomy Picture of the Day:

http://apod.nasa.gov/apod/ap151207.html

The comet is sporting both dust (lower left) and ion (upper right) tails,
December 10, 2015 Annual Banquet

How to Capture and Keep Children's Interest in Science

Constance L. Martin-Trembley

The WAS annual banquet will be held on Thursday, December 10th at the DeCarlo Banquet and Conference Center. Connie Trembley will be our speaker.

Connie has been a local science teacher for the past 16 years. She began her college education at Michigan Technological University, with plans on following her lifelong dream of becoming an oceanographer. Fate stepped in during her second year and placed her future husband Bob directly in her path. Putting schooling aside for a time they concentrated on creating their family and had two daughters, Rachel and Amanda, whom they could experiment on and subject to an unusual childhood. By the age of 30 Connie set her goals on completing her college education and chose to become a teacher focusing on science.

Connie has since gone on to complete her master’s degree in science education, be chosen teacher of the year in 2007, run two different Girl Scout troops in tandem (should have had those girls closer together), become a volunteer NASA/JPL Solar System Ambassador, and have an asteroid named after her. Her passion in the sky and space was instilled in her by her mother, nurtured by her husband, and found its passion passing the knowledge along to children.

Connie at Musecon 2015 with Br. Guy Consolmagno (left), and fellow volunteer NASA/JPL Solar System Ambassadors Bill Higgins of Fermilab (right) and husband Bob Trembley.
**Future Society Meeting Presentations**

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<th>Date</th>
<th>Location</th>
<th>Presenter</th>
<th>Title</th>
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<tbody>
<tr>
<td>Dec. 10</td>
<td></td>
<td>Constance Martin-Trembley</td>
<td>How to Capture and Keep Children's Interest in Science</td>
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<tr>
<td>Dec. 17</td>
<td></td>
<td>Constance Martin-Trembley</td>
<td>Macomb meeting cancelled for Banquet</td>
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**2016**

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<th>Date</th>
<th>Location</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>Jan. 4</td>
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<td>Gary Ross</td>
<td>North American Astronomy When the New Age Began</td>
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<tr>
<td>Jan. 4</td>
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<td>Joe Tocco</td>
<td>Four Hundred Dollar Free Telescope <em>(short)</em></td>
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<td>Jan. 21</td>
<td>Macomb</td>
<td>Dave Bailey</td>
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<td>Feb. 1</td>
<td>Cranbrook</td>
<td>Prof. David Gerdes</td>
<td>The Coolest Place in the Solar System: new trans-Neptunian Worlds from the Dark Energy Survey</td>
</tr>
<tr>
<td>Feb. 18</td>
<td>Macomb</td>
<td>Dr. Jerry Dunifer</td>
<td>Telescopes I Have Known and Loved</td>
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<tr>
<td>Mar. 7</td>
<td>Cranbrook</td>
<td>Doug Bock</td>
<td>Time Lapse Photography</td>
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**“In the Sky” Presentations—We Need Your Help!**

The W.A.S. invites members to present “In the Sky” segments on important and timely events to watch for in skies over the next month.

**Guidelines:**

Segments will be about five minutes; therefore they cannot be comprehensive, but instead will have to hit on important information, and timely events. Not running over time or getting caught up in minutia is critical.

- Chose about five items for presentation.
- Each item will have one or two slides, and about 1 minute of time.
- Slides are to be given to Ken at least a day in advance to be added to the end of his "In the News" segment.

Item choices should follow these priorities, until the total of five are chosen:

1. Rare special events (e.g. Venus transit, Jupiter triple shadow transit, telescopic NEO)
2. Solar and lunar eclipses
3. Major meteor showers
4. Planetary conjunctions
5. Mars, Jupiter, Saturn approaching opposition
6. Mercury, Venus approaching greatest elongation
7. Showpiece deep sky object approaching midnight culmination (space permitting)
8. Other, at presenter's discretion, if space permits (e.g. ISS flyover, algol minima, challenge DSO, favorite constellation, action at Jupiter's moons, etc.)

Much of the above is available in tabular format in the RASC Observers handbook, which could be shared with presenters as needed.

If YOU would like to give a presentation at a Warren Astronomical Society meeting, contact: Dale Partin. firstvp@warrenastro.org. Presentations can be 5, 10, 15 or 40 minutes in length. Topics can include things such as: star party and convention reports, astronomy, cosmology, personal projects, science, technology, historical figures, How-To’s, etc...
November 2015 Discussion Group at Jon & Rosie Blum’s

Back row: Jerry, Grant, Jeff, Dale, Alan, Mike, Bob, Jim, Joe
Middle row: Ken, Cheryl, Joyce, Steve, Therese, Caroline, Sharon, Toni, Dennis
On floor: Jon, John, Bill, Ruth, Gary, Parker

Each November, Jon Blum and his wife Rosie host a Discussion Group Meeting (i.e.: a WAS party) at their home. The photo above is one of about 50 taken of the group who attended last month.

See attendees from past years here: [http://www.jonrosie.com/astronomy/discussion/](http://www.jonrosie.com/astronomy/discussion/)
Astronomy Outreach

On 11/16, Bob Berta, Ken Bertin, and Angelo DiDonato presented again to the Macomb chapter of the Society of Active Retirees (SOAR) to widespread clamor for a second encore, which will likely take place in May of next year.

Mark Kedzior and Dale Thieme assisted Grosse Pointe Library system patrons with telescope orientations on the night of 11/18, though bad weather again prevented observing. We plan to have more telescope training offered in December and a Family Night observation session sometime in January.

Noel Night at the Michigan Science Center was supported by Jonathan Kade, and Parker Huellmantel. About a hundred guests got to look through a telescope, some for the first time in their lives... even if what they got to see was artificial lights thanks to the Michigan Nebula's uninvited presence at the event.

Joe Tocco and others will assist students from North Hill Elementary in Rochester on Wednesday the 9th. This is our second time assisting this school in 2015.

A Science Olympiad group from Atwood Elementary in Macomb would like a volunteer to assist with their Starry Night program on Thursday 12/17, including a laser tour of the heavens. Bring your own laser.

Finally, Cranbrook is running a special program called Night Life from Saturday 11/26 through 11/30. Each day from 1 to 4 PM Cranbrook plans to offer education on the wonders of the night including star charts, giant planets, and solar viewing. We are welcome to bring telescopes for indoors and outdoors and "whatever else you might have to offer." This is something we can help them with, so please sign up!

That should close out 2015 for us. It's been a good year.

Diane Hall
Outreach Chair

Help us with Outreach! With the growing number of requests, we could always use your help!

Saw a Fireball?

Report it! to the American Meteor Society.

http://www.amsmeteors.org/members/fireball/report-a-fireball

The American Meteor Society is a non-profit scientific organization established to inform, encourage, and support the research activities of both amateur and professional astronomers who are interested in the fascinating field of Meteor Astronomy.
Stargate Observatory
Monthly Free Astronomy Open House and Star Party

4th Saturday of every month!
2015: Dec. 26,
2016: Jan. 23, Feb. 27, Mar. 26

Wolcott Mill Metropark
Camp Rotary entrance
(off 29-mile road, just east of Wolcott Rd.)

- Sky tours.
- Look through several different telescopes.
- Get help with your telescope.
- *We can schedule special presentations and outings for scouts, student or community groups.*

Contact: outreach@warrenastro.org

Find us on MeetUp.com: meetup.com

Observatory Rules:
1. Closing time depends on weather, etc.
2. May be closed one hour after opening time if no members arrive within the first hour.
3. Contact the 2nd VP for other arrangements, such as late arrival time. Call (586) 634-6240.
4. An alternate person may be appointed to open.
5. Members may arrive before or stay after the scheduled open house time.
6. Dates are subject to change or cancellation depending on weather or staff availability.
7. Postings to the Yahoo Group and/or email no later than 2 hours before starting time in case of date change or cancellation.
8. It is best to call or email the 2nd VP at least 2 hours before the posted opening with any questions. Later emails may not be receivable.
9. Generally, only strong rain or snow will prevent the open house... the plan is to be there even if it is clouded over. Often, the weather is cloudy, but it clears up as the evening progresses.
**Stargate Observatory Update**

**November Open-house**
The regular Open-house was held on Saturday the 28th three days following the full moon. Sunset was at 5:00 PM and Astronomical Twilight ended at 6:41. Riyad Matti opened the observatory at 5:37 PM. He noted that the gate was locked so if you arrive early to an open-house and find the gate locked don’t despair, we have the key!

The night started with mostly cloudy conditions and became mostly clear by the time the last visitors left around 10:30 PM. There were roughly 25 people visiting Stargate including 7 club members. Double stars, deeps sky objects and at the end, the moon were all viewed between the clouds and haze (report by Riyad Matti.)

**December Open-house**
The regular Open-house is scheduled for Saturday the 26th the day after the full moon and the day after Christmas Day. Sunset is at 5:03 PM and Astronomical Twilight ends at 6:45 PM. Arrive just before sunset (or sooner if you plan to set up a scope.)

*A friendly reminder to be courteous if you arrive after dark and dim your headlights upon entry to the park, also no white light flashlights at all.*

If you are setting up a large scope or have a lot of equipment to set up then you are permitted to park on the observing field preferably with your vehicle lights pointed away from the observatory and other telescopes.

**Observatory Update:**
Several security lights have appeared at Camp Rotary but they are not new, simply existing lights that have been repaired and restored to operation. The park management is aware that they are causing some distress for us and are very receptive to accommodating the club by masking lights, giving us access to turn them off or replacing them with night-sky friendly fixtures. The club will work with the park to a mutually beneficial resolution.

The dome-drive at Stargate is becoming more problematic and will need to be rebuilt, replaced or otherwise addressed soon.

There will be more to follow on both items over the coming months.

*Joe Tocco*
*2nd VP*
*Stargate Observatory Chairman*
DECEMBER 2015
Notable Sky Happenings

Dec. 1 - 7
The Moon is to the right of Jupiter in the S before dawn on the 3rd. The following morning it's to the left. The morning of the 5th it's to the right of Mars in the SE. On the 6th it's below Mars and above the star Spica. On the 7th it's to the right of Venus.

Dec. 8 - 14
Geminid meteor shower peaks on the 13th & 14th. Expect 50-60 "shooting stars" per hour. It's best viewed from midnight to sunrise.

Dec. 15 - 21
Winter begins for the Northern Hemisphere at 11:48pm EST on the 21st.

Dec. 22 - 31
The Moon is to the right of Jupiter in the SSW before sunrise on the 31st.

Now Showing
"Mystery of the Christmas Star"
Travel back in time 2,000 years to explore the nature of the "Star" that guided the wise men to Bethlehem. We will examine astronomical events that were occurring at the time and see if any were remarkable enough to have sparked the journey. (Extra shows are presented during the holidays.)

Also Showing
"Let It Snow"
"Let it Snow" features a new variety of festive classics from Frank Sinatra and Chuck Berry to Burl Ives and Brenda Lee, and includes a finale by the Trans Siberian Orchestra. The soundtrack is visually enhanced with thematic animation and all-dome scenery. This 32-minute program is a fun and entertaining experience for all ages, especially families.

For astronomy information visit http://science.cranbrook.edu

This chart shows the sky as it appears at approximately 8pm EST near mid-month at northern mid-latitudes.
**Object of the Month**

*By Chuck Dezelah*

**NGC 2264** is an open star cluster associated with nebulosity that lies in the constellation Monoceros the unicorn. Although this obscure and indistinct constellation is little known to all but the most avid of amateur astronomers, its contents are amongst the richest in all the heavens. NGC 2264 is particularly notorious. Within its boundaries are the Christmas Tree Cluster, which is a large, well-defined grouping of stars that are neatly arranged in a visually striking triangular outline, strongly reminiscent of the conifer commonly displayed at this time of year. The accompanying nebula, by contrast, is exceedingly difficult to observe except under pristine skies. This object is the famed Cone Nebula, which sits in an inverted position relative to the cluster, with its apex oriented directly towards the pointed top of the tree. This ensemble is linked with a wide expanse of faint nebulosity throughout the region, which likely incorporates the nearby Rosette Nebula as well. The cluster has a Trumpler Classification of IV3pn, indicating no central concentration, widely varying stellar magnitudes, relatively few member stars, and the presence of nebulosity.

The Christmas Tree Cluster portion of NGC 2264 is easy to observe, but somewhat more difficult to locate. It is positioned about 7° south of Alhena (γ Geminorum, mag. 1.9) and about 3.5° south-southwest of ξ Geminorum (mag 3.4). The cluster contains the star 15 Monocerotis (mag. 4.7) which is naked eye visible from dark sites and can be used for easy pinpointing when conditions permit. This star happens to also be a multiple with magnitude 7.5 and 9.8 partners that are separated from the primary by 3” and 17” respectively. The cluster is easily visible in telescopes of nearly any aperture, and can even be spotted in binoculars. Low magnification and wider fields of view are generally more favorable and allow viewers to appreciate the overall shape more satisfyingly. A moderate increase in power might allow for an improved view of the nebulosity and can enrich the appearance of individual stars within the cluster.

This column is a recurring feature written with the intention of introducing a new object each month that is visible from Stargate Observatory using a moderate-sized telescope typical of beginner and intermediate level amateur astronomers. In particular, special focus will be given to objects that are not among the common objects with which most observers are
NGC 2264
In infrared
Brad Vincent reviews a new magazine: "TELESCOPE MAKING", while Dennis Jozwik searches for the perfect lens for astrophotography in “An Extraordinary Lens for Astrophotography???” . Loretta D. Caulley discusses “Cassiopeia: the Lady in the Chair” and Lou Faix muses over the follies of hubris in “The Apprentice Astronomers Notebook My Apologies, Mr. Burnham”.

Ken Kelly keeps us up to date “From The IAU Circulars.” In “February Eclipsed Sky Preview”, Ray Bullock talks about an upcoming eclipse, his article cut off by missing page(s).

From the Scanning Room
December of 2015 would mark the end of the available archived WASPs. However, with the addition of the 1984 issues and Rik Hill’s collection, I can extend the archive report on for another year or two. The digitizing program took a bit of a back seat to my treasurer duties this past couple of years, but that is coming to an end now and I can dive back into the fray with renewed gusto.

Speaking of the WASP, there is a certain faction in this club who feels my scanning skills will translate over to actually publishing the current WASP. Come January, we get to find out if my minion is right. Debra Chaffins and Bob Trembley set a high bar for any future editor and, wouldn’t you know, I became that future editor. Gulp!

Dale Thieme, Chief Scanner
Looking like an apparition rising from whitecaps of interstellar foam, the iconic Horsehead Nebula has graced astronomy books ever since its discovery more than a century ago. The nebula is a favorite target for amateur and professional astronomers. It is shadowy in optical light. It appears transparent and ethereal when seen at infrared wavelengths. The rich tapestry of the Horsehead Nebula pops out against the backdrop of Milky Way stars and distant galaxies that easily are visible in infrared light.

Hubble has been producing ground-breaking science for two decades. During that time, it has benefited from a slew of upgrades from space shuttle missions, including the 2009 addition of a new imaging workhorse, the high-resolution Wide Field Camera 3 that took the new portrait of the Horsehead.
MEMBERSHIP

We currently have 135 members (26 of which are family memberships).

INCOME AND EXPENDITURES (SUMMARY)

We took in $1561.52 and spent $671.27. We have $17,066.33 in the bank and $190.09 in cash, totaling $17,278.42 as of 11/30/2015.

INCOME

$309.19 Memberships/Renewals
$10.66 Amazon referral fee
$295.14 2016 Calendar
$25.00 Jackets and Windbreakers
$32.00 Snacks
$889.53 2015 Annual Banquet

EXPENSES

$15.00 Speaker Travel expenses
$44.28 Snacks
$1.64 Mailing
$610.35 Reimbursement- 2016 calendars printing costs (Jonathan Kade)

$12,917.05 Total donated to date for The Stargate Fund
$6622.66 remaining

$317.69 Donated to the Paul Strong scholarship to date

We have our PayPal account all set up now. We can receive donations two ways through this avenue: Those with PayPal accounts can authorize payments to treasurer@warrenastro.org, we also have a card reader and can swipe credit cards onsite. Dale Thieme and Jonathan Kade have readers to help split the workload. The costs incurred for transactions are minimal. For example, we received $25 donations through both PayPal methods. The email version yielded a net $24.15, the credit card swipe gave us $24.32.

Dale Thieme, Treasurer
30 November 2015

For Sale

Dale Mayotte selling an 11” Celestron CPC, JMI mobile case, HD Pro wedge, an array of 1.25 EPs with carrying case 12.5 mm illuminated reticle ep, and 1.25 diagonal, Celestron 2” EP set and diagonal with case, ADM rails and counterweight setup, 9x50 finderscope, full aperture solar filter, Williams Optics Digital focuser, 11” dew heater. 5mm Baader Hyperion ep and 13mm Baader Hyperion ep which can be used as either 1.25” or 2”

The dew controller died, so that is the only thing unavailable for it.

Dale is asking $3200 OBO for everything!
Contact him Through Facebook, via the link above.
Lying along the boundary of Perseus and Andromeda, near Cassiopeia, is the small planetary nebula M76. More commonly known as the Little Dumbbell, it is also referred to in the literature as the cork nebula or butterfly nebula. It contains a central star with a 16.6 magnitude and a temperature of 60 thousand degrees Kelvin.

M76 is one of the faintest Messier objects and also is one of only four planetary nebulae in the list. Although discovered by Pierre Mechain in 1780 and added to the list by Messier a few months later, it was not correctly classified as a planetary until 1918. William Herschel observed it in 1787 and believed it to consist of two nebulae in close contact, even providing separate NGC numbers for each section: 650 and 651. There had also been some slight visual disagreement between Mechain and Messier, with the former saying it contained no stars and the latter that it consisted of nothing but stars and a little nebulosity. Its distance is currently estimated as between 2500 and 2600 light years and the apparent magnitude at 10.1. However, new data from the Hubble space telescope indicate it may have a distance closer to 3900 light years.

In the image above, the bright orange giant star below the planetary is HIP 8063 (also HD 10498). It has a visual magnitude of 6.66 and is measured at a distance of 848 light years away from Earth.

Ralph DeCew
Gary Ross and a few astronomy friends from the Grand Rapids/Lansing area. Breakfast at Kissing Rock farm. November 2015
WAS Board Meeting
November 2nd, 2015
Board members present: Jonathan Kade, Diane Hall, Dale Partin, Joe Tocco, Bob Trembley, Dale Thieme, and Jeff Macleod.

President:
Jonathan started officer reports. As President he reminded the board that we have a full list of candidates for the 2016 board elections, as well as a full list of recipients for the banquet awards.

1st Vice President:
Dale Partin informed the board that he is working on getting speakers for the first half of next year, and he still needs a presenter for the January Cranbrook meeting, Jonathan K is a possible fill in. Dale also said that we are reasonable booked for the next few months.

2nd Vice President:
Joe Tocco told the board that the October openhouse on the 24th was opened by Riyad M in his absence and closed by Jeff M, there wasn’t much of a turnout due to the weather. The November openhouse is scheduled for the 28th under another large moon, but it will be getting dark early and we should have an hour of dark skies before moonrise.

Treasurer:
Dale Thieme notified that the treasury report would be in the wasp.

Secretary:
Minutes from last month’s board meeting will be in the latest issue of the WASP. The first of the donations for the banquet have arrived and some last minute donation requests have been sent out.

Outreach:
Diane informed the board that there is not a lot on the calendar for November right now, there is a Thursday night scout event that may be changing to a better date for us to help with outreach. There will be a Boy Scout troop at Stargate on Friday the 6th, and then there is a Girl Scout group having a large event on Saturday the 7th looking for people to help with activity and demonstration tables.

Publications:
Bob Trembley notified the board that the alpha WASP went out earlier in the day and that the final should be published in a few days.

Old Business:
The board then went over old business. The two current Eagle Scout projects are still a go and the scout are now waiting on approval from their leaders so they can start generating funds. The idea of adding a cover to a light at the fire station across the field from stargate to one of the projects was proposed. Joe Tocco and Bob Trembley are still researching weather a solar scope or a solar filter is the best option for solar observing at Stargate. The Honor Roll plaques for stargate have been finished and given to Joe T to install at Stargate. Recipients have been chosen for the banquet awards, in other banquet news we have booked our usual piano player (Gus Povirk), the menu has been selected and promotion in the only thing left to do.

New Business:
The board had a few items to vote on this meeting, first was the recipient of the Paul Strong scholarship, we are not the final say on who will receive the scholarship but the board reviewed the candidates, Diane hall set a motion to give the scholarship to a particular candidate and the motion passed six to one, I will release the name when we get confirmation from Macomb Community College. Insurance was the next topic up for discussion, Dale Partin moved to drop the insurance for stargate, Joe Tocco seconded, but after much back and forth Jeff MacLeod moved to table the motion to drop the insurance, Joe Tocco seconded.

The Board adjourned at 7:30

WAS General Meeting
Cranbrook, November 2, 2015
The meeting was started at 7:32 with 45 people in attendance, two of which were new.

(Continued on page 24)
President:
Jonathan opened the meeting and introduced himself. Attendees announce their names, and then Jonathan began officer reports. As president he informed the club that there is not much in November but the banquet will be December 10th, Bob Trembley’s wife Connie will be our speaker for the banquet, giving a talk entitled “capturing and holding children’s interest in science”. If you need tickets see Dale Thieme, $30 at a meeting or $35 at the door. Jonathan then said a few words about Rick Kovari, who has unexpectedly passed, Jonathan said a bit about Rick’s history with the club, other organizations and where the services would be held.

1st Vice President:
Dale announced that the next Macomb meeting, Bob Trembley will present “Exploring the Solar System” then at the next Cranbrook meeting Marty Kunz will present “Astronomy year in review” Dale also reminded members to see him if they are interested in presenting next year.

2nd Vice President:
Joe informed the club that the open house for October wasn’t spectacular; a few visitors made it out and were able to do minimal observing. The November openhouse is scheduled for the 28th, it will be getting dark early and we should get an hour of dark skies before moon rise.

Treasurer:
The financial situation was reviewed in brief. Details can be found in the Treasurer’s section in latest issue of the WASP. There is currently about $16k in the bank account and we have 133 memberships. Dale also reminded members that they can renew their memberships or new members could sign up and get the rest of the year free.

Secretary:
The minutes from each WAS board meeting and general meeting will be published in each monthly issue of the WASP. Jeff also made a plea to club members for donations for the Christmas banquet.

Outreach:
Diane went over recent outreach events such as the Grosse Pointe Library Telescope program. Diane then went over a last minute event that had come to her that day via an email. The Girl Scouts are having a “space event” in which they will skype with an astronaut. They are looking for volunteers to help with demo tables. More info on upcoming and past outreach events can be found in the outreach officer report in the WASP. People looking to volunteering for upcoming outreach events please contact Diane at Outreach@warrenastro.org or check the outreach report in the WASP.

Publications:
Bob let the club know that the WASP is almost done, Bob then asked for remembrances of Rick Kovari for the WASP.

Jon Blum then made a small announcement inviting members to his house for the discussion group, November 24th at 8pm.

In the News: presented by Ken Bertin. His bi-weekly recap of astronomical stories covered such topics as changes in Jupiter’s red spot, new Hubble image of earliest galaxies, Pluto’s moon Kerberos, New Horizons aiming towards next target, a spacewalk on October 28th. Ken also did a short remembrance of Rick Kovari.

In the Sky: Ken also presented in the sky. Taurid fireballs this week, peaking early November, conjunctions of Venus-Mars on the 3rd, and conjunctions of Mars-Venus & a crescent Moon on the morning of the 7th.

Presentation (Short talk):
Elections for Board officers were held in lieu of a short talk, Ken Bertin presided over the voting and read the bylaws.
For the position of President Diane Hall was nominated, Jeff MacLeod moved to vote, Jonathan Kade seconded and Diane Hall was elected as President for 2016.
For the position of 1st Vice President Ralph DeCew was nominated, Jeff MacLeod moved to vote, Diane Hall seconded and Ralph DeCew was elected as 1st Vice President for 2016.
For the position of 2nd Vice President Jeff MacLeod was nominated, Jonathan Kade moved to vote, Diane Hall seconded and Jeff MacLeod was elected as 2nd Vice President for 2016.

(Continued from page 23)

(Continued on page 25)
For the position of Secretary Dennis David was nominated, Jeff MacLeod moved to vote, Cheryl Kaplan seconded and Dennis David was elected as Secretary for 2016
For the position of Treasurer Joe Tocco was nominated, Jonathan Kade moved to vote, Dale Thieme seconded and Joe Tocco was elected as Treasurer for 2016
For the position of Outreach Chairman Bob Trembley was nominated, Jon Blum moved to vote, Jonathan Kade seconded and Bob Trembley was elected as Outreach Chairman for 2016
For the position of Publications Director Dale Thieme was nominated, Jonathan Kade moved to vote, Marty Kunz seconded and Dale Thieme was elected as Publications director for 2016

Presentation (Long talk):
Professor Sean Gavin, theoretical nuclear physicist from Wayne State University presented his lecture entitled, Delusion, Fusion, and the age of the Sun. Professor Gavin told the history of two prominent debates for the history of physics. The first being between Charles Darwin and Lord William Kelvin, Sean explained why these two powerhouses of science when toe to toe over the age of the earth. In the second half of his talk Professor Gavin shared another battle of theory from the history books, this one between George Gamow and Fred Hoyle. In this story both ended up being right about some things and wrong about others, although Hoyle would never admit to that.

The meeting was ended at 9:45pm.

WAS General Meeting
Macomb, November 19\textsuperscript{th}, 2015

The meeting was started at 7:30 with 38 people in attendance. (2 new)

Officer Reports:
Jonathan Kade introduced himself and ran through officer reports, as president he said that the major news was that the calendars are almost here; they will be available at the next Cranbrook meeting and the banquet. Jonathan also made it known that banquet tickets could be purchased that evening.

1\textsuperscript{st} Vice President:
At the next Cranbrook meeting Marty Kunz will give “An Astronomical Year in Review” and Jon Blum will give a short talk. There is an open spot for a short talk at the February Cranbrook meeting.

2nd Vice President:
The November openhouse is scheduled for Saturday the 28\textsuperscript{th}, Sunset will be at 5pm with moonrise following at 8pm. Jonathan also noted that there is some newly completed signage at stargate (honor roll plagues).

Treasurer:
The financial situation was reviewed in brief. Details can be found in the Treasurer’s section in latest issue of the WASP. There is currently about 16k in the bank. It was also announce that you can purchase banquet tickets and calendars through Dale Thieme.

Secretary:
The minutes from each WAS board meeting and general meeting will be published in each monthly issue of the WASP. Jonathan also reminded members that the secretary is still accepting donations for the banquet door prizes.

Outreach:
Jonathan recalled recent outreach events including Bob Berta, Ken Bertin, and Angelo DiDonato presented to S.O.A.R., as well as Mark Kedzior and Dale Thieme assisting at the Grosse Pointe Library. Upcoming event include Noel Night at the Michigan Science Center on December 5\textsuperscript{th}. Cranbrook will also be running a special program called Night Life from Saturday the 26\textsuperscript{th} through the 30\textsuperscript{th}. For more info from the outreach report or if you are looking to volunteering for upcoming outreach events please contact Diane at Outreach@warrenastro.org or check the outreach report in the WASP.

In the News
Ken Bertin provided his biweekly insightful look at the latest developments in astronomy. Topic such as Mars dust devils, Swift spacecraft’s 1000\textsuperscript{th} gamma ray burst, recent pictures from Curiosity, Pluto’s moons spinning wildly, Mars moon phobos falling apart over the next 30million years, Asteroids

(Continued on page 26)
buzzing earth, supersonic winds on exoplanet discovered, and curiosity heading towards active dunes on mars.

In the Sky
Diane Hall presented “In the Sky”. The Leonids are happening now, the morning of the 26th the moon will occult Aldebaran (the eye of Taurus), this is a good time of year for the Pleiades, also good for Andromeda (M31), and comet Cataline could reach 6th to 5th Mag by the end of the month and could possibly be a naked eye object by the end of December.

Presentation (long talk):
Bob Trembley presented his talk entitled “Exploring the Solar System”
In his talk Bob covered the solar system, from the sun to the outer planets; he even covered proto planets like Ceres and Pluto, the asteroid belt, the Kuiper belt and many moons. He showed the members in attendance useful graphics and gave interesting information about each object including missions that have been sent to these places.

The meeting was ended at 9:35  
- Jeff Macleod  
Secretary

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<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>02</td>
<td>06:53</td>
<td>Regulus 3.0°N of Moon</td>
</tr>
<tr>
<td>03</td>
<td>02:40</td>
<td>LAST QUARTER MOON</td>
</tr>
<tr>
<td>04</td>
<td>01:21</td>
<td>Jupiter 1.8°N of Moon</td>
</tr>
<tr>
<td>04</td>
<td>13:33</td>
<td>Moon at Ascending Node</td>
</tr>
<tr>
<td>05</td>
<td>09:56</td>
<td>Moon at Apogee: 404800 km</td>
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<tr>
<td>05</td>
<td>21:40</td>
<td>Mars 0.1°N of Moon: Occn.</td>
</tr>
<tr>
<td>06</td>
<td>14:42</td>
<td>Spica 4.4°S of Moon</td>
</tr>
<tr>
<td>07</td>
<td>11:55</td>
<td>Venus 0.7°S of Moon: Occn.</td>
</tr>
<tr>
<td>11</td>
<td>05:29</td>
<td>NEW MOON</td>
</tr>
<tr>
<td>14</td>
<td>13:00</td>
<td>Geminid Meteor Shower</td>
</tr>
<tr>
<td>18</td>
<td>01:01</td>
<td>Saturn 6.1°N of Antares</td>
</tr>
<tr>
<td>18</td>
<td>10:13</td>
<td>Moon at Descending Node</td>
</tr>
<tr>
<td>18</td>
<td>10:14</td>
<td>FIRST QUARTER MOON</td>
</tr>
<tr>
<td>21</td>
<td>03:53</td>
<td>Moon at Perigee: 368418 km</td>
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<td>21</td>
<td>23:48</td>
<td>Winter Solstice</td>
</tr>
<tr>
<td>22</td>
<td>21:00</td>
<td>Ursid Meteor Shower</td>
</tr>
<tr>
<td>23</td>
<td>09:18</td>
<td>Mars 3.3°N of Spica</td>
</tr>
<tr>
<td>23</td>
<td>14:09</td>
<td>Aldebaran 0.7°S of Moon</td>
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<tr>
<td>25</td>
<td>06:11</td>
<td>FULL MOON</td>
</tr>
<tr>
<td>28</td>
<td>22:00</td>
<td>Mercury at Greatest Elong: 19.7°E</td>
</tr>
<tr>
<td>29</td>
<td>15:30</td>
<td>Regulus 2.7°N of Moon</td>
</tr>
<tr>
<td>31</td>
<td>12:55</td>
<td>Jupiter 1.5°N of Moon</td>
</tr>
<tr>
<td>31</td>
<td>15:19</td>
<td>Moon at Ascending Node</td>
</tr>
</tbody>
</table>


The Farmer's Almanac calls December's Moon the "Oak Moon", "Cold Moon", "Long Nights Moon." It is also known as the "Winter Moon."
Early November, 2015, enjoyed idyllic weather for southern Michigan, warm with cloudless skies to match. Uranus was well placed for evening observation, having passed opposition on the 12th of October.

In this space a year ago, the Author related how on a stunningly clear night in October at a certain location in the northern Lower Peninsula, Gary Repella and he had set out to see the moons of Uranus. (2) Mr. Repella used an 8-inch telescope whilst the Author employed the 22-inch McCullough reflector of the Astronomical Society. This "one shot" field study yielded nothing, from which we concluded that seeing had been the limiting factor, the bright planet having aggravated any turbulence, 5.7 at opposition.

The satellites are actually quite bright:
ARIEL, 13.7; UMBIEL, 14.5; TITANIA, 13.7; OBERON, 13.7. (3) It is interesting how such small bodies of modest albedo can be so bright at 19 Astronomical Units.

In the Observer's Handbook, Note 14 under "Observable Satellites . . .", states, "Best within 6 weeks of opposition", sound advice which might be on the conservative side. (4) An occulting bar is also recommended for the first two moons. 2015 opposition was on the 12th of October.

First of November
This was the most transparent of the three nights. The 16-inch ("Mighty") Borr Telescope at the James C. Veen Observatory was employed using a 15mm. narrow field Plossl, which yielded 310-320X. No satellites were observed.

Second of November
The same telescope and eyepiece, but no result.

Third of November
This combined observation was with the 17-inch Hawkins Reflector and a variety of eyepieces. At the telescope were D. L. DeBruyn, C. J. Miller, and K. T. Tyrrell. (5) The evening sky was slightly turbid, but not enough to cancel point objects brighter than 14th magnitude. No satellites were observed despite controlled collective viewing. Additionally, no detail could be seen on Uranus proper in keeping with the previous nights.

The Author has observed the satellites in past decades with a smaller telescope, the former 11-inch Schmidt-Cassegrain in the east dome of the Veen Observatory, but such acquisitions were very rare. It is important to emphasize that he has never routinely observed Uranus, so these are simple forays at planetary observing. Locale plus low elevation makes observations a challenge, aggravated by the "mid-latitude cyclone belt" to keep seeing in flux. Again, per the article of a year ago: aperture is not everything in observing, and may even be a junior partner in the enterprise.

NOTES:
(1) Number three is closing in fast!
(2) The site must be kept secret for hemispheric security.
(4) Ibid.
(5) This cabal is calls itself the Best and the Brightest, much disputed in the Grand Rapids Astronomical Association.

Ariel from Voyager 2, 1986. Credit: NASA/JPL-Caltech
G. M. Ross

The “Second Greatest Observer in Michigan”

&

Head Chef at the Cadillac West Spring Star Party

Photo by Bill Beers
**Observatory Viewing** every Friday & Saturday evening at 7:30pm-10:00pm  
**Solar Observing** every First Sunday of the Month: 12:30pm-3:00pm  
**Acheson Planetarium** Shows:

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Show</th>
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</thead>
<tbody>
<tr>
<td>Daily</td>
<td>1:30 pm</td>
<td>Michigan Sky Tonight</td>
</tr>
<tr>
<td>Monday-Saturday</td>
<td>3:30 pm</td>
<td>Michigan Sky Tonight</td>
</tr>
<tr>
<td>Friday/Saturday</td>
<td>7:00 pm</td>
<td>Invaders of Mars!</td>
</tr>
<tr>
<td>Friday/Saturday</td>
<td>8:00 pm</td>
<td>Michigan Sky Tonight</td>
</tr>
<tr>
<td>Saturday</td>
<td>11:30 am</td>
<td>Invaders of Mars!</td>
</tr>
<tr>
<td>Saturday</td>
<td>11:30 am</td>
<td>One World, One Sky: Big Bird’s Adventure</td>
</tr>
<tr>
<td>Saturday/Sunday</td>
<td>1:30 pm</td>
<td>Michigan Sky Tonight</td>
</tr>
<tr>
<td>Saturday/Sunday</td>
<td>2:30 pm</td>
<td>Invaders of Mars!</td>
</tr>
<tr>
<td>Saturday</td>
<td>3:30 pm</td>
<td>Michigan Sky Tonight</td>
</tr>
</tbody>
</table>

Image Credit: Cranbrook
I’d like to share a few tidbits of spaceflight and orbital terminology I now know intimately from running Kerbal Space Program:

- Apoapsis - farthest point from the body being orbited.
- Periapsis - closest point to the body being orbited.
- Delta-v (Δv) - The change in velocity that has or can be exerted by the spacecraft. This is measured in meters per second (m/s).
- Docking Maneuvers - Don’t work at all unless you remember to put @#$&! RCS thrusters on your spacecraft...
- Hohmann Transfer - the most frequently used method of changing orbital altitudes while keeping the same inclination. The ending orbit may be around the same celestial body as it began, or for travelling to another body. Note: you will hear this type of orbital transfer referred to in the movie “The Martian.”
- Aerobraking - Lowering the periapsis so it is inside a planetary atmosphere. This will lead to the vessel being slowed by atmospheric drag, reducing its apoapsis. Can lead to atmospheric entry.
- Atmospheric Entry - You forgot to put a heatshield on your spacecraft… didn’t you?
- Inclination Changes - Will take more delta-v, and thus more propellant, the closer you are to the body being orbited.
- Lithobraking - Using the lithosphere of a planetary body to rapidly decelerate your vehicle; an unintended crash-landing.
The Warren Astronomical Society is a Proud Member of the Great Lakes Association of Astronomy Clubs (GLAAC)

GLAAC is an association of amateur astronomy clubs in Southeastern Michigan who have banded together to provide enjoyable, family-oriented activities that focus on astronomy and space sciences.


### GLAAC Club and Society Meeting Times

<table>
<thead>
<tr>
<th>Club Name &amp; Website</th>
<th>City</th>
<th>Meeting Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astronomy Club at Eastern Michigan University</td>
<td>Ypsilanti/EMU</td>
<td>Every Thursday at 7:30PM in 402 Sherzer</td>
</tr>
<tr>
<td>Capital Area Astronomy Club</td>
<td>MSU/Abrams Planetarium</td>
<td>First Wednesday of each month 7:30 PM</td>
</tr>
<tr>
<td>Ford Amateur Astronomy Club</td>
<td>Dearborn</td>
<td>Fourth Thursday of every month (except November and December) at 5:30 PM</td>
</tr>
<tr>
<td>Oakland Astronomy Club</td>
<td>Rochester</td>
<td>Second Sunday of every month (except May)</td>
</tr>
<tr>
<td>Seven Ponds Astronomy Club</td>
<td>Dryden</td>
<td>Monthly: generally the Saturday closest to new Moon</td>
</tr>
<tr>
<td>Sunset Astronomical Society</td>
<td>Bay City/Delta College Planetarium</td>
<td>Second Friday of every month</td>
</tr>
<tr>
<td>University Lowbrow Astronomers</td>
<td>Ann Arbor</td>
<td>Third Friday of every month</td>
</tr>
<tr>
<td>Warren Astronomical Society</td>
<td>Bloomfield Hills/ Cranbrook &amp; Warren/MCC</td>
<td>First Monday &amp; third Thursday of every month 7:30 PM</td>
</tr>
</tbody>
</table>

### GLAAC Club and Society Newsletters

- **Warren Astronomical Society**: [http://www.warrenastro.org/was/newsletter/](http://www.warrenastro.org/was/newsletter/)
- **Oakland Astronomy Club**: [http://oaklandastronomy.net/newsletters/oacnews.html](http://oaklandastronomy.net/newsletters/oacnews.html)
- **Sunset Astronomical Society**: [http://www.sunsetastronomicalsociety.com/SASNewsletters.htm](http://www.sunsetastronomicalsociety.com/SASNewsletters.htm)
- **University Lowbrow Astronomers**: [http://www.umich.edu/~lowbrows/reflections/](http://www.umich.edu/~lowbrows/reflections/)

### WAS Member Websites

- Jon Blum: [MauiHawaii.org](http://MauiHawaii.org)
- Bob Trembley: [Balrog’s Lair](http://Balrog’s Lair)
- Bill Beers: [Sirius Astro Products](http://Sirius Astro Products)
- Jon Blum: [Astronomy at JonRosie](http://Astronomy at JonRosie)
- Bob Trembley: [Vatican Observatory Foundation Blog](http://Vatican Observatory Foundation Blog)
- Jeff MacLeod: [A Life Of Entropy](http://A Life Of Entropy)
Photograph the Universe From
Your Living Room!

***FROM THE DARK SKIES IN ARIZONA***

Apache-Sitgreaves Research Center, in Overgaard, Arizona, is gearing up to offer remote access to some of the best skies in the northern hemisphere from the comforts of your own home. Please join us as we enter this next phase of our operations here at Apache-Sitgreaves. Our facility at Apache-Sitgreaves Research Center has been in existence for over ten years providing people with extraordinary visual observing and we want to expand it to include remote imaging.

Our goal:
To provide the most cost effective, remote access, digital imaging system using our very large telescope at our world-class dark sky site.

What we need:
We need your help! To provide an incredible experience you will never forget, please make a contribution to our Dare Mighty Things campaign on Indiegogo by mid-December to make this happen. http://igg.me/at/DareMightyThings

About us:
Our private location is in the Apache-Sitgreaves National Forest. Located at roughly 7000-foot elevation, in the desert of northern Arizona (yes, there are cactus here among the pine), is where you’ll find some very dark skies. This is a World-Class observatory site and our neighbors are quite famous; Lowell Observatory and Discovery Channel Telescope - all of us on the edge of the Colorado Plateau.

Our flagship telescope at Apache-Sitgreaves is a fully computer controlled Go-To 36-inch f4.5 Newtonian telescope with an effective focal length of 4732mm using a Canon 60Da DSLR. In comparison, our 36-inch scope has 20x the aperture of an 8-inch telescope!

We also have a Wide-Field system comprised of the same Canon 60Da DSLR with a 50mm lens on a separate mount to provide lunar, Milky Way, or comet imaging.
We provide an opportunity for you to hang beautiful astro-photos on your wall. All of our systems use familiar software like TheSkyX-Pro and MaximDL, so astro-imagers can feel at home running this system (and partly because they are in their own living room doing it. Even if you are new to digital imaging we provide on-site support for your session!

So, please, make a contribution to our Dare Mighty Things campaign on Indiegogo by mid-December to make this happen. http://igg.me/at/DareMightyThings. You can also visit our website at www.Apache-Sitgreaves.org or contact me at SLAggas@msn.com for more information. Follow us on Facebook at ‘Apache-Sitgreaves Research Center’ and Twitter @DeepSpaceNow (who doesn’t like a message from deep space, right?).
We appreciate your contributions and Happy Imaging!

Thank you, Steven Aggas
NASA All-Sky Fireball Network

The NASA All-sky Fireball Network is a network of cameras set up by the NASA Meteoroid Environment Office (MEO) with the goal of observing and triangulating on fireballs. The collected data will be used by the MEO in constructing models of the meteoroid environment, which are important to spacecraft designers.

The network requires that three of these R2D2 like cameras be setup within 75 miles of each other; they have been setup on top of schools, science centers, observatories, planetariums, etc… As of this writing, there are NONE of these devices setup anywhere in Michigan. I’d like to see that changed.

I’m pretty sure we know some people with an observatory, in dark skies of Michigan...

- Bob Trembley

Site Requirements for Participation in the NASA All Sky Fireball Network

Camera

Need an outdoor location that is/has

- Secure
- A mostly unobstructed view of the sky, horizon to horizon
- Relatively free of light pollution – no bright lights near the camera. For example:
  - No sports field or stadium lights nearby
  - No towers with blinking lights visible
  - No parking lot lights that would shine into the camera
- Stable; we cannot mount a camera on a moving roof or other platform that would change the camera’s position from night to night.
- Distant from kilowatt radio transmitters or other sources of radio noise

Camera-control Computer

Need an indoor location that is/has

- Secure
- Climate controlled (ideally)
- Power
- Fast, reliable Internet connection (minimum upload speed of 100 KB/s) with the ability to assign a static IP address
- The ability to open port 22 for internet communication in/out (only necessary if a firewall is in place)
- Located within 100 feet of the camera
- The means to run cables from the camera to the computer
- A window or some other means (e.g. short cable run to the outdoors) by which the GPS unit can get a lock. The cable on the GPS receiver is 22 feet long, so the window would need to be located within 22 feet of the computer. Similarly, a cable run to the outdoors shouldn’t be more than 22 feet long.
Fill out this form and return it to Ms. Danielle Moser at the following address, along with pictures of the site and the horizon at the proposed camera location.

Danielle Moser, EV44
NASA Marshall Space Flight Center
Huntsville, AL 35812
danielle.e.moser@nasa.gov

Contact Information
Name: ____________________________
E-mail: ____________________________
Phone #: ____________________________
Organization: ____________________________
Type of Organization: Private Commercial Non-profit Education

Proposed Camera Location
Address: ____________________________
GPS coordinates: ____________________________
Physical location: Roof Other: ____________________________
Will camera be located near parking lot, stadium, or street lights? Yes No
Estimate distance to the nearest street or parking lot light: ____________________________

Proposed Camera Control Computer Location
(must be within 125 feet of the camera location; must have power and internet connection;
must be situated so computer GPS has view of sky through window or other means)
Physical location: ____________________________
Distance to the proposed camera location: ____________________________
Distance to the nearest window/outdoor access: ____________________________
Climate controlled? Yes No

Internet
Type of Internet: DSL Cable Other: ____________________________
Able to assign static IP address? Yes No
Camera control computer behind a firewall? Yes No
Internet upload speed: ____________________________

Reason for hosting camera
__________________________________________________________
__________________________________________________________
We’d like to see your photos and articles in the W.A.S.P. Your contribution is ESSENTIAL! — This is YOUR publication!

Send items to: publications@warrenastro.org

Documents can be submitted in Microsoft Word (.doc or .docx), Open Office (.ods), or Text (.txt) formats, or put into the body of an email. Photos can be embedded in the document or attached to the email and should be under 2MB in size. Please include a caption for your photos, along with dates taken, and the way you’d like your name to appear.

Seven Ponds Open Invitation

WAS members are invited to The Seven Ponds Astronomy Club monthly meetings.

More information about upcoming meetings, maps to Seven Ponds Nature Center, etc. is available at www.sevenpondsac.com.

Please let John Lines know if you might attend so that appropriate.

IC 5146 Cocoon Nebula
by Bill Beers 9/19/15
using 11" f/6.3, QHY8L, 17 x 10 min