ASTRONOMY CLUB OF TULSA

# OBSERVER

JANUARY 2015

INSIDE THIS ISSUE:





**THE ASTRONOMY CLUB TULSA IS A PROUD MEMBER OF**

**THE ASTRONOMICAL LEAGUE**

PHOTO: On December 28, 2014, a phenomenon called the "Lunar X" was visible next to the terminator on the moon. This photo was taken with a Canon Rebel attached to a Celestron 4" refractor, using the telescope as a lens, with the camera set to 1/125 sec. exposure and ISO of 100.

PHOTO CREDIT: TAMARA GREEN

# JANUARY 2015

| SUN | MO | TUE | WED | THU | FRI | SAT |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

**MOON PHASES AND HOLIDAYS:**

| | |
|---|---|
| NEW YEAR'S DAY | THU JAN 1 |
| FULL MOON (Wolf or Old Moon) | SUN JAN 4 |
| LAST QUARTER | TUE JAN 13 |
| MARTIN LUTHER KING, JR DAY | MON JAN 19 |
| NEW MOON | TUE JAN 20 |
| FIRST QUARTER | MON JAN 26 |
| SPORTING EVENTS AT JENKS HS: | |
| BASKETBALL | FRI JAN 16 |
| BASKETBALL | FRI JAN 23 |

**UPCOMING EVENTS:**

| | | | |
|---|---|---|---|
| SIDEWALK ASTRONOMY | SAT JAN 3 | 5:30 PM | BASS PRO |
| GENERAL MEETING | FRI JAN 9 | 7:00 PM | JENKS HS PLANETARIUM |
| MEMBERS' NIGHT | FRI JAN 16 | 6:00 PM | ACT OBSERVATORY |
| MEMBERS' NIGHT BACKUP | SAT JAN 17 | 6:00 PM | ACT OBSERVATORY |
| PUBLIC STAR PARTY | SAT JAN 24 | 5:30 PM | ACT OBSERVATORY |
| GENERAL MEETING | FRI FEB 6 | 7:00 PM | JENKS HS PLANETARIUM |
| SIDEWALK ASTRONOMY | SAT FEB 7 | 6:00 PM | BASS PRO |
| MEMBERS' NIGHT | FRI FEB 20 | 6:15 PM | ACT OBSERVATORY |
| MEMBERS' NIGHT BACKUP | SAT FEB 21 | 6:15 PM | ACT OBSERVATORY |
| PUBLIC STAR PARTY | SAT FEB 28 | 6:30 pm | ACT OBSERVATORY |

# FEBRUARY 2015

| SUN | MO | TUE | WED | THU | FRI | SAT |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |

**MOON PHASES & HOLIDAYS:**

| | |
|---|---|
| FULL MOON (Snow or Hunger Moon) | TUE FEB 3 |
| LAST QUARTER | WED FEB 11 |
| VALENTINE'S DAY | SAT FEB 14 |
| PRESIDENTS' DAY | MON FEB 16 |
| NEW MOON | WED FEB 18 |
| FIRST QUARTER | WED FEB 25 |
| SPORTING EVENTS AT JENKS HS: | |
| BASKETBALL | FRI FEB 6 |
| BASKETBALL | FRI FEB 13 |
| BASKETBALL | FRI FEB 27 |

# PRESIDENT'S MESSAGE

BY RICHARD BRADY

Hi everyone! Your new president here, promoted from vice-president. After the election I realized that no one else ran for president. Do they all know something I don't? I guess I'll find out. :-)

I hope everyone had a Happy Christmas and a Merry New Year! Did anyone get any astronomical goodies from Santa? Please let the club know. If you want, bring them to the general meeting at Jenks Planetarium on Friday, January 9, and show off your new toys.

The next time you are out at the observatory, you might notice a new addition. There are four antennas in a square just to the east of the building. These are part of a radio antenna. One of our members, Brad Young, has started a new Astronomical League Observing program dealing with radio astronomy. He has an article elsewhere in this newsletter about what he is doing.

At this time last year we were having a new roof put on the classroom. We also got wi-fi up at the observatory. The board has discussed several more projects we would like to get done in the coming year. These include:

- purchasing the land around the observatory. We have a lease for many decades to come, but the board agrees it would be better to own the property outright. It might also help in trying to get some grants to improve the observatory.

- installing security cameras around the observatory. James Taggart and Chris Proctor have been working on this and should have them up and running in the next few months. They will be connected to the Internet so we will also be able to check the weather before heading out.

- repairing the skirting around the dome and possibly replacing the cables that open and close the shutter in the dome.

- painting both the inside and outside of the observatory.

- Repairing/replacing a couple of cinder blocks on the west side of the observatory building that were damaged by water. If anyone knows of a brick mason, please let James Taggart know.

- Any suggestions on what else we could do to make our observatory better? Let me know at astrotulsa.pres@gmail.com.

The board is making up a survey trying to find out what the members of the club would like to see us do. Would you like to have group discussions/presentations about astrophotography? ATM (Amateur Telescope Making, which can include grinding your own mirror)? Radio Astronomy? Astronomy 101? Something else? This is your club and we want to encourage everyone in whatever part of astronomy you are interested in. Please let me know.

Also, I need your help. Do you know of someone who would be willing to give a presentation at one of our monthly club meetings? Maybe some of the professors from the universities around here. Or if any club members would have something they would like to present (like Skip Whitehurst did when he showed us his trip to South America) please let me know. We have the meetings in January through May, September, October, and December. We didn't have many presentations last year and I want to start having them again regularly. Let me know and so I can contact them and try to set something up.

Finally, if you have the old email addresses in your contact lists, the ones that end in @astrotulsa.com, please update them to our new addresses that end in @gmail.com. We are trying to get rid of the old @astrotulsa.com ones. The new @gmail.com addresses are at the end of the newsletter.

Clear Skies! (We fervently hope. December was a bad month for observing, and early in 2014 we had lots of weather cancellations. Let's hope for a better year in 2015.)

Happy New Year

Richard Brady

# TREASURER'S AND MEMBERSHIP REPORT

BY TIM DAVIS

**Astronomy Club of Tulsa: 136 members, including 52 new members in 2014.**

**Welcome to our new members this month:** Graciela Herrera, Kylie Shell, Carmin Sanders and Eric Perner

Club Accounts as of Dec 31, 2014:

**Checking: $ 3,450.34**
**Savings: $ 3,771.90**
**Investment accounts: $ 19,257.22** *(Value Fluctuates with Market)*

**PayPal: $ 0.00**

**The club now has PayPal available for you** to start or renew memberships and subscriptions using your credit or debit cards. Fill out the registration form at http://astrotulsa.com/page.aspx?pageid=16 **Click Submit** and you will be given the choice of either **mailing in your dues** with a check **or using PayPal** which accepts most major credit cards. A modest processing fee is added to PayPal transactions.

You may also renew your membership or join at one of our club events using your credit card by seeing one of our officers. We can take payments with the Square card reader now. A small fee is also added on to these transactions.

**ALSO NOTE:** For our current members who are renewing their memberships, you can now go to a new link on the website to start your renewal process. On the home page, hover over the "Member" tab on the ribbon menu near the top of the page. Then select the "Membership Renewal" link and this will take to a page to fill out your information. Fill this out, submit it, then pay your dues by whatever method you choose.

**NEWS NOTE:** Both Sky & Telescope and Astronomy have free Digital subscriptions available with print subscriptions, or Digital subscriptions may be purchased separately. Contact their websites for details.

Membership rates for 2014 are as follows:

**Adults: $ 45.00 per year, includes Astronomical League Membership.**

**Sr. Adult: $ 35.00 per year for those 65 or older, includes Astro League Membership.**

**Students: $ 30.00 with League membership; Students: $ 25.00 without League membership.**

**Additional Family membership: $ 20.00 with voting rights and League membership; $ 15.00 with voting rights but without League Membership.**

**The regular membership allows all members in the family to participate in club events, but only ONE Voting Membership and one Astronomical League membership.**

**Join Online – Add or renew magazine subscriptions: http://www.astrotulsa.com/page.aspx?pageid=16**

**Magazine Subscriptions:** If your magazines are coming up for renewal, try to save the mailing label or renewal form you get in the mail. Forms are available on the club website.

**Astronomy is $ 34.00 for 1 year, or $ 60.00 for 2 years: www.astronomy.com**

To get the club discount you must go through the club group rate.

**Sky & Telescope is $ 33.00 per year: www.skyandtelescope.com**

Sky & Telescope also offers a 10% discount on their products.

Note: You may renew your Sky & Telescope subscription directly by calling the number on the renewal form, be sure to ask for the club rate.

NEW SUBSCRIPTIONS must still be sent to the club.

# 2015 Wall Calendar

**The 2015 Astronomy Magazine Wall Calendars are here and we only have a few left. If you would like to reserve one, send me an email at AstroTulsa.Tres@gmail.com, or call me at 918-665-8134 and let me know if you would like one. Otherwise, they will be available on a first come, first served basis while they last at our upcoming events. The price is now reduced to $8.00 each, cash, check or credit cards accepted.**


**Get yours while you can!**

**Tim Davis**
**ACT Treasurer**

# SECRETARY'S CORNER

BY TERESA DAVIS

Editor's Note:  Beginning with next month's edition of the Observer, we will have a new column called "Secretary's Corner", in which our new Secretary, Teresa Davis, plans to reflect on decisions that were made at General and Board meetings, stuff that we have voted on, and stuff that we plan to do and need volunteers for.

As far as Board meeting minutes, since these are for Club members only, she will send a link to Google Docs for the official minutes, so that Club members can read them at their leisure.  These will be read-only documents.

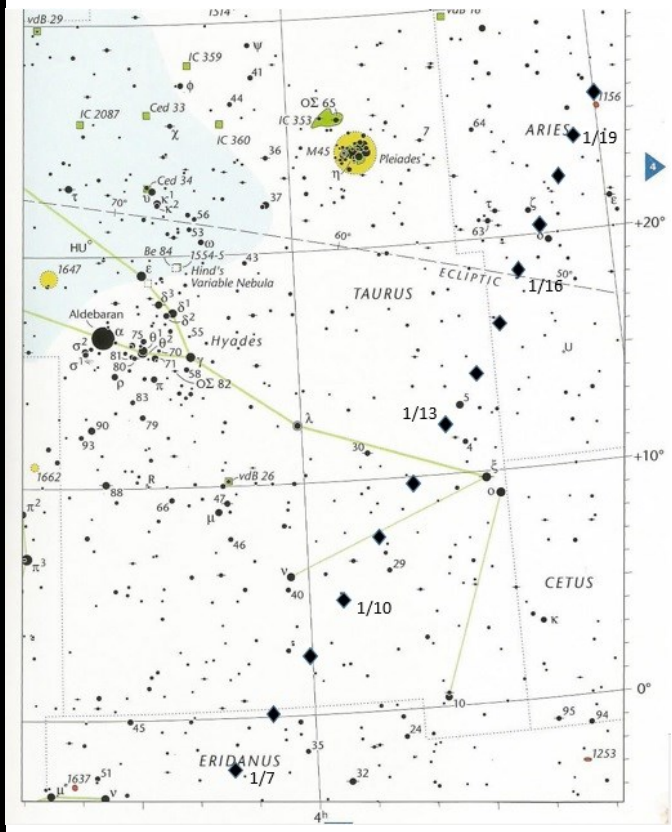
I hope that you will enjoy her column!

Tamara

# NITELOG—NorwayInTErurbanLocalObservingGroup

BY TOM HOFFELDER

Wow, 2015 - time sure flies when ye're havin' fun - Happy New Year! And yes, the objects are still running ahead of the evening sky, but I did some checking and that will get corrected once we hit Virgo, as I expected. However, some of the extended objects are high enough to observe by 9 and all the stars can be observed by 7. Plus there is always last month's list! But above and beyond all that, check out the following comet info!

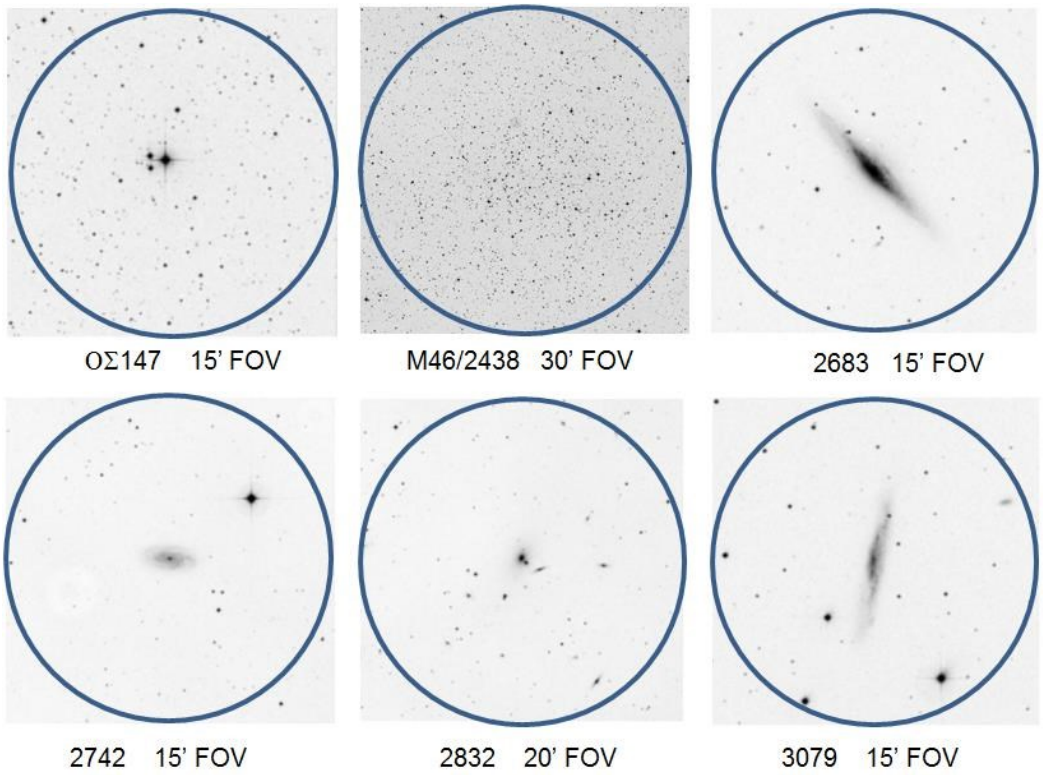



**COMETS:** A (relatively) **bright** (mag 5?) **comet** (Lovejoy 2014 Q2), **high in the evening sky**, with **no moon!** When's the last time that happened?!!! Now if it will only be clear on some of the dates shown on the two comet attachments, we'll be all set! The comet spreadsheet also has info on 15P/Finlay; it was not expected to be brighter than magnitude 10 (my cut off) at its peak in January, but since it already is, maybe it will stay there.

**PLANETS:** Oh, we're bein' followed by a moon shadow, moon shadow... Have you ever seen two shadows on Jupiter? How about three? Check out the attached jup.xls to discover when this month provides two opportunities for the former and one for the latter! It's all about the big guy this month; Jupiter has risen high enough in the east for observation (~10 degrees) starting around 8:30 on the first and, as you should expect, around 6:30 by the end of January. There is one good (mag drop of 1) mutual eclipse of a Galilean moon, and only one same as last month. This time Callisto eclipses Ganymede from 4:06 to 4:19 AM EST on the 23rd - see the attached 4E3.jpg for the relative moon locations then. The timing isn't nearly as convenient as the Dec event, but since this is something I've never seen, it's on my calendar. There are other events but none in the one magnitude range. If you're interested check this S&T article: http://www.skyandtelescope.com/sky-and-telescope-magazine/beyond-the-printed-page/mutual-events-jupiters-satellites-201415/

Actually there is a bit more planet-wise than Jupiter. Mercury reaches eastern elongation on the 14th and Venus has also recently started its climb into the western evening sky. Normally I wouldn't mention either at this time - Mercury stays low when elongation occurs in the winter and Venus is boring before elongation - but the two of them are separated by less than a degree on the 8th thru 12th. Always fun to see two planets in a scope at once, even if individually at the time neither would be very interesting. You will need a low southwest horizon, with the pair being only 8 to 12 degrees high (depending on your latitude) one half hour after sunset.

**STARS:** Three bright carbons with B-Vs around 3.5, which means they SHOULD be very red. Six doubles and one triple are included; and if you are surprised to see 40b Eri there again, you are not paying attention. Also someone recently pointed out that 40 Eri is the location of Spock's Vulcan! All the doubles with spectral classes listed should show notable color difference, based on the classes. And the triple is included in the photos, to show its symmetry since most triples are not symmetrical at all.




Double star data previously presented was from Burnham's, which means it may have been rather dated, especially the separation values for nearby short period binaries. Someone, the same source as Spock's Vulcan, provided a double star link (http://stelledoppie.goaction.it/index2.php?section=2) which I will be using from now on for separation, magnitudes and spectral class.

**THE GOOD STUFF:** Eight Messier (6 OC's and 2 well known GX's) and 15 Herschel 400 (5 OC's, 1 PN and 9 GX's) objects, two of which double as M's. You get to see an H400 object in front of an M, plus in a 20' field of view there is a bunch of little fuzzies that activate our optic nerves with 300 million year old photons! If you do experience that, and don't feel at least a little dizzy, you aren't "seeing" the whole picture.

**QUESTIONS:** As always, questions and comments are welcome!

tom hoffelder
rocksnstars@gmail.com

*Come with me now, Pilgrim of the stars,*
*For our time is upon us and our eyes*
*Shall see the far country*
*And the shining cities of infinity* ~ Robert Burnham, Jr.

**JAN 2015**
**COMET**
**LOVEJOY**
**(2014 Q2)**

| Date | EST | RA* | Dec* | Star | N/S | E/W | Mag[1] | Urano I | Alt[2] | [3]EoAT | [3]MR/MS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 18:00 | 04 15.3 | -02 37 | 32 Eri | 0.4 N | 5.2 E | 5.5 | 223 | 30° | 18:04 | 19:08R |
| 8 | 19:00 | 04 08.3 | +00 01 | 32 Eri | 3.0 N | 3.4 E | | 223 | 41 | | 20:06R |
| 9 | 20:00 | 04 01.4 | +02 38 | ν Tau | 3.4 S | 0.7 W | | 223 | 48 | | 21:04R |
| 10 | 20:00 | 03 54.9 | +05 07 | ν Tau | 0.9 S | 2.0 W | | 177 | 51 | | |
| 11 | 20:00 | 03 48.6 | +07 33 | ν Tau | 1.5 N | 3.4 W | | 177 | 53 | | |
| 12 | 20:00 | 03 42.4 | +09 55 | 5 Tau | 3.0 S | 2.9 E | | 177 | 56 | | |
| 13 | 20:00 | 03 36.5 | +12 12 | 5 Tau | 0.7 S | 1.3 E | | 177 | 58 | | |
| 14 | 20:00 | 03 30.6 | +14 25 | 5 Tau | 1.5 N | 0.1 W | | 177 | 60 | | |
| 15 | 20:00 | 03 25.0 | +16 33 | 5 Tau | 3.6 N | 1.5 W | 5 | 177 | 61 | | |
| 16 | 20:00 | 03 19.5 | +18 35 | δ Ari | 1.1 S | 1.9 E | | 131 | 63 | | |
| 17 | 20:00 | 03 14.2 | +20 32 | δ Ari | 0.8 N | 0.5 E | | 131 | 64 | | |
| 18 | 20:00 | 03 09.1 | +22 23 | δ Ari | 2.7 N | 0.7 W | | 131 | 65 | | |
| 19 | 20:00 | 03 04.2 | +24 09 | δ Ari | 4.5 N | 1.8 W | | 131 | 65 | | |
| 20 | 20:00 | 02 59.5 | +25 49 | 41 Ari | 1.5 S | 2.3 E | | 131 | 66 | | |
| 21 | 20:00 | 02 54.9 | +27 24 | 41 Ari | 0.1 N | 1.2 E | | 130 | 66 | 18:18 | 18:26S |
| 22 | 20:00 | 02 50.5 | +28 53 | 41 Ari | 1.6 N | 0.1 E | | 130 | 65 | | 19:41S |
| 23 | 21:00 | 02 46.1 | +30 22 | 41 Ari | 3.1 N | 0.9 W | 5.5 | 93 | 55 | | 20:56S |

*At EST noted

[1]http://www.aerith.net/

[3]Norway/Paris

[2]Norway/Paris, at EST noted

JUPITER IN JAN 2015 (EST)

| DATE | GRST* | I SHAD | E SHAD | G SHAD | C SHAD |
|---|---|---|---|---|---|
| 0 | | 23:27- | | | |
| 1 | 01:17 | 01:44 | | | |
| 2 | | | | | |
| 3 | 22:46 | | | | |
| 4 | | | | | |
| 5 | 04:33 | | | | |
| 6 | 00:24 | | | | |
| 7 | | | | | |
| 8 | 02:02 & 21:53 | 01:20-03:37 | | | |
| **9** | | 19:48-22:05 | 20:15-23:09 | | |
| 10 | 23:31 | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | 21:00 | | | | |
| 14 | | | | | |
| 15 | 02:47 & 22:38 | 03:13-05:30 | | | |
| **16** | | 21:41-23:59 | 22:51- | | |
| 17 | 04:25 | | 01:46 | | |
| 18 | 00:16 & 20:07 | | | 20:15-23:53 | |
| 19 | | | | | |
| 20 | 01:54 & 21:45 | | | | |
| 21 | | | | | |
| 22 | 03:32 & 23:23 | | | | |
| 23 | 19:14 | 23:35- | | | 22:11- |
| **24** | 05:10 | 01:52 | 01:28-04:22 | | 03:00 |
| 25 | 01:01 & 20:52 | 18:03-20:21 | | | |
| 26 | | | | 00:13-03:52 | |
| 27 | 02:39 & 22:30 | | | | |
| 28 | | | | | |
| 29 | 04:17 | | | | |
| 30 | 00:08 & 19:59 | | | | |
| 31 | 05:55 | 01:28-03:46 | 04:04-06-59 | | |

*Transit, visible +/- 50 min

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SS | NTE | ATE | MR | SS | CTE | NTE | ATE |
| 16:23 | 17:32 | 18:07 | 22:02 | 16:31 | 17:04 | 17:39 | 18:14 |

| Object (Type) | RA | Dec | Star | N/S | E/W | Mag*/(# of Stars) | Size (')/ *Sep (")* | Spect/ M# or H# | Dist (ly) | Urano I Page | Comment, [B-V], {mag*}, (optimum x) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R Lep (CS) | 04 59.6 | -14 48 | μ Lep | 1.4 N | 3.2 W | 5.9-11… | | C | | 269 | [3.5] {~7} |
| W Ori (CS) | 05 05.4 | +01 11 | $\pi^5$ Ori | 1.2 S | 2.8 E | 6.5-10… | | C | | 224 | [3.6] {~6} |
| Y Tau (CS) | 05 45.7 | +20 42 | ζ Tau | 0.4 S | 1.9 E | 7.1-9.5 | | C | | 136 | [3.4] {~7.5} |
| 32 (w) Eri (MS) | 03 54.3 | -02 57 | --- | --- | --- | 5, 6 | *6.9* | G8, A2 | | 222 | ADS 2850 (70) |
| 40 Eri ($o^2$) (MS) | 04 15.3 | -07 39 | γ Eri | 5.8 N | 4.2 E | 4.5, 9.5 | *83* | G9 | 16 | 268 | ADS 3093 (6) |
| 40b Eri (MS) | --- | --- | --- | --- | --- | 10, 11.5 | *8.2* | DA, dM4 | 16 | 268 | P.A. 331 (60) |
| β87 (MS) | 04 22.4 | +20 49 | ε Tau | 1.7 N | 1.4 W | 6, 9 | *1.9* | B3, K3 | | 133 (ni) | ADS 3158 (240) |
| ω Aur (MS) | 04 59.3 | +37 53 | ι Aur | 4.7 N | 0.4 E | 5, 8 | *4.7* | | | 97 | ADS 3572 (100) |
| Σ644 (MS) | 05 10.3 | +37 18 | prev | 0.6 S | 2.2 E | 6.5, 7 | *1.7* | B2, K3 | | 97 (ni) | ADS 3734 (280) |
| OΣ147* (MS) | 06 34.3 | +38 05 | θ Gem | 4.1 N | 3.7 W | 7,8.5,9.5 | *43, 46* | | | 99 (ni) | ADS 5188 (12) |
| NGC 2421 (OC) | 07 36.2 | -20 37 | ξ Pup | 4.2 N | 3.1 W | (50) | 8.0 | *H67-7 | 3100 | 319 | |
| NGC 2423 (OC) | 07 37.1 | -13 52 | α Mon | 4.3 S | 1.0 W | (60) | 12 | *H28-7 | 5900 | 274 | |
| NGC 2422 (OC) | 07 36.6 | -14 29 | prev | 0.6 S | 0.1 W | (50) | 25 | M47 | 3750 | 274 | |
| NGC 2437* (OC) | 07 41.8 | -14 49 | prev | 0.5 S | 1.2 E | (150) | 20 | M46 | 5900 | 274 | |
| NGC 2438 (PN) | 07 41.8 | -14 44 | prev | 0.1 N | --- | 10.8 | 1.2 | *H39-4 | 5400 | 274 | "In" M46 |
| NGC 2447 (OC) | 07 44.5 | -23 51 | ξ Pup | 1.0 N | 1.1 W | (60) | 10 | M93 | 3600 | 320 | |
| NGC 2548 (OC) | 08 13.7 | -05 45 | ζ Mon | 2.8 S | 1.6 E | (80) | 30 | M48 | 3100 | 230 | also *H22-6 |
| NGC 2571 (OC) | 08 18.9 | -29 45 | ρ Pup | 5.5 S | 2.5 E | (25) | 7.0 | *H39-6 | 3100 | 362 | |
| NGC 2567 (OC) | 08 18.5 | -30 38 | prev | 0.9 S | 0.1 W | (50) | 11 | *H64-7 | 4100 | 362 | |
| NGC 2632 (OC) | 08 40.4 | +19 40 | γ Cnc | 1.5 S | 0.8 W | (75) | 70 | M44 | 500 | 141 | Beehive |
| NGC 2655 (SB0-a) | 08 55.6 | +78 13 | 23 (h) Uma | 15.1 N | 1.9 W | [13.2] | 4.9X4.1 | *H288-1 | 78M | 7 | between 2 mag 7 *s |
| NGC 2681 (SB0-a) | 08 53.5 | +51 19 | 15 (f) Uma | 0.3 S | 2.4 W | [12.7] | 3.6X3.3 | *H242-1 | 43M | 44 | 13m GX 2693 0.5 E |
| NGC 2682 (OC) | 08 51.3 | +11 48 | α Cnc | 0.1 S | 1.8 W | (65) | 25 | M67 | 2700 | 187 | |
| NGC 2683* (Sb) | 08 52.7 | +33 25 | ι Cnc | 4.5 N | 1.2 E | [12.8] | 9.3X2.1 | *H200-1 | 32M | 102 | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NGC 2742* (Sc) | 09 07.6 | +60 29 | ο UMa | 0.2 S | 4.6 E | [12.9] | 3.0X1.5 | *H249-1 | 75M | 44 | |
| NGC 2768 (E6) | 09 11.6 | +60 02 | prev | 0.5 S | 0.5 E | [13.2] | 6.4X3.0 | *H250-1 | 65M | 44 | |
| NGC 2775 (Sab) | 09 10.3 | +07 02 | ζ Hya | 1.1 N | 3.8 E | [13.1] | 4.3X3.3 | *H2-1 | 65M | 187 | |
| NGC 2832* (E2) | 09 19.8 | +33 45 | α Lyn | 0.7 S | 0.2 W | [13.8] | 3.0X2.0 | --- | 300M | 103 | + 8 |
| NGC 3034 (Sd) | 09 55.9 | +69 41 | 23 (h) Uma | 6.7 N | 1.9 E | [12.7] | 11X4.3 | M82 | 12M | 23 | also *H79-4 |
| NGC 3031 (Sb) | 09 55.6 | +69 04 | prev | 0.7 S | 0.1 W | [13.0] | 25X11 | M81 | 12M | 23 | |
| NGC 3077 (Sd) | 10 03.3 | +68 44 | prev | 0.3 S | 0.8 E | [13.3] | 5.2X4.7 | *H286-1 | 12M | 23 | |
| NGC 3079* (SBc) | 10 02.0 | +55 41 | υ UMa | 3.3 S | 1.6 E | [13.2] | 8x1.3 | *H47-5 | 62M | 45 | 3073 0.2 W |

*DSS image

*[Surf Brtnss for GX's] - mag per square arcmin

*H400

but not identified

ni=shown

* current for CS

# RADIO JOVE

BY BRAD YOUNG


The Astronomy Club of Tulsa has begun a new radio astronomy project at the Mounds observatory. A small group of us have installed the antenna array of the Radio Jove system, which we procured from NASA. As some of you may have noticed, the Astronomical League has begun a new award program for radio astronomy. There are five different fundamental sources listed for observers to contribute data to NASA and other institutions in our continuing exploration of space. One of these is the giant planet Jupiter. The science and application of observational data surrounding radio emissions from Jupiter is well explained at the Radio Jove website, so I will not elaborate here. Our mission is to install, troubleshoot, and begin data to the scientific community using the equipment we have installed on the hill. Once we reach the point where the system is humming along, we plan to send data to NASA and make the equipment available to authorized Club members to use at outreach events at the observatory.

What you will notice when you drive up to the observatory (that is if it ever clears up) are two dipoles 20 feet in the air strung between four metal posts and connected with coax cable to a receiver inside the observatory. Actually, as of this writing, we have not completed the installation but hope to very soon. We have marked the posts and die ropes that hold them in place with safety tape and orange cones to make sure everyone can see them both while parking and walking around in the dark. They're quite out of the way, located just east of the classroom entrance and set back a bit to allow for parking as usual.

# RADIO JOVE

BY BRAD YOUNG, CT'D.

The astronomy club of Tulsa radio observing team consists of James Taggart, Michael Blaylock, and Brad Young. James is director of facilities and communication. Michael is the project engineer and construction superintendent. Brad Young is responsible for cutting the ropes too short for the guy wires. Further assistance has been from Harriet Young, who besides putting up with Brad's fits, also assisted in repair work on the array and other various duties. My son and his friend both assisted me in construction of the dipoles including soldering when I was still in my sling after shoulder surgery. We will keep you up-to-date on our progress and hope to have real data to impress you with before the next newsletter. The prime time for observing Jupiter is from now until May, so it will fit nicely into the usual poor weather season for visual observing. If you have any questions, or would like to help, please contact Brad Young via the Astro Tulsa Yahoo group.

Recommended resources:

http://astroleague.org/programs/radio-astronomy-observing-program

**Radio-Jupiter Central** – This is a great resource from the folks at Society of Amateur Radio Astronomers (SARA). Lots of background information about observing Jupiter, and how to build the necessary equipment. (http://www.radiosky.com/rjcentral.html)

***Radio JOVE – RJ1.2 Antenna Kit Assembly Manual 2012*** – (http://radiojove.gsfc.nasa.gov/telescope/ant_manual.pdf)

*"**Amateur Radio Astronomy Projects – Radio Signals from Jupiter**"* – Article by Jon Wallace (fjwallace@snet.net) and Richard Flagg (rf@hawaii.rr.com) – (http://www.radio-astronomy.org/pdf/qex/radio-jove-proof.pdf)

**Video of Example Radio Bursts from Jupiter** – (https://www.youtube.com/watch?v=H6wkt_8a-6A&list=PLC14C1CDE89B9E835&index=3)

**RadioJOVE at the International Space University** – (http://astro.u-strasbg.fr/~koppen/RJove/JoveAtISU.html)

# Keeping an Eye on Storms and More

By Kieran Mulvaney

In late July 2013, Tropical Storm Flossie barreled furiously toward Hawaii. The question was not if it would strike, but when and where it might do so.

During the afternoon hours of July 29, forecasts predicted landfall later that week on the state's Big Island; however, by the time residents of the 50th state awoke the following morning things had changed. NOAA's Central Pacific Hurricane Center warned that the islands of Oahu, Molokai and Maui were now at a greater risk.

This overnight recalculation was thanks to the Day/Night Band viewing capabilities of the Visible Infrared Imaging Radiometer Suite, or VIIRS, on board the Suomi National Polar-Orbiting Partnership (Suomi NPP) satellite. VIIRS is able to collect visible imagery at night, according to Mitch Goldberg, program scientist for NOAA's Joint Polar Satellite System (JPSS), of which Suomi NPP is a part. That means it was able to spot some high-level circulation further north than expected during the nighttime hours. This was an important observation which impacted the whole forecast. Without this forecast, said the Hurricane Center's Tom Evans, "we would have basically been guessing on Tropical Storm Flossie's center."

Polar-orbiting satellites, like Suomi NPP and the future JPSS-1 and JPSS-2 (scheduled for launch in 2017 and 2021, respectively), sweep in a longitudinal path over Earth as the planet rotates beneath them—scanning the globe twice a day. VIIRS, the imager that will be aboard all the JPSS satellites, images 3,000 km-wide swaths on each orbit, with each swath overlapping the next by 200 km to ensure uninterrupted global coverage. This high-resolution, rapidly updating coverage allows researchers to see weather patterns change in near real-time.

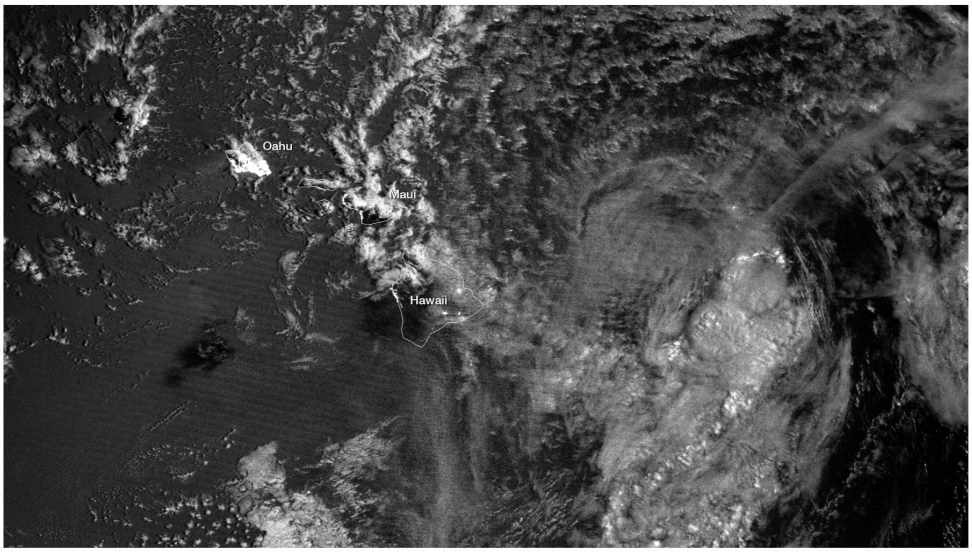
Instruments on Suomi NPP allow scientists to study such long-term changes too—things like, "the patterns of sea surface temperature, or coral bleaching," says Goldberg. They are even used by the World Bank to determine how much energy is burned off and wasted from natural gas flares on oil drilling platforms.

While scientists are excited by the JPSS series' wide range of capabilities, the ability to address pressing immediate concerns is, for many, the most tangible value. That was certainly the case in July 2013, when thanks to Suomi NPP, authorities had ample time to close ports and facilities, open shelters, activate emergency procedures, and issue flash flood warnings. Despite heavy rains, high surf, and widespread power outages, accidents and injuries were few. By the time the storm passed, Hawaii was soaked.

But it was largely unharmed.

*Learn more about JPSS here: http://www.jpss.noaa.gov.*

*Kids can learn all about how hurricanes form at NASA's Space Place: http://spaceplace.nasa.gov/hurricanes*




*S-NPP captured this image of Tropical Storm Flossie heading toward Hawaii using its VIIRS Combined Day-Night Band sensor. Credit: NOAA.*

*Editors download picture here: http://www.jpss.noaa.gov/images/Flossie-CombinedDNB-0729.png*

## WHERE WE MEET

JENKS HIGH SCHOOL PLANETARIUM

105 E. B ST. JENKS, OK

**DIRECTIONS TO THE JENKS HIGH SCHOOL CAMPUS:**

**FROM THE WEST: (MARKED IN RED ON MAPS)**

TAKE US 75 TO THE MAIN ST. - JENKS EXIT

FOLLOW MAIN ST. APPROXIMATELY 2 MILES AND CROSS THE RAILROAD TRACKS

TURN LEFT ON 1ST ST.

**FROM CENTRAL PART OF TULSA: (MARKED IN GREEN ON THE MAPS)**

TAKE RIVERSIDE DRIVE TO THE 96TH STREET BRIDGE

TURN RIGHT AND GO OVER THE RIVER

FOLLOW A ST. APPROXIMATELY 7 BLOCKS

TURN RIGHT ON 1ST ST.

**FROM THE EAST: (MARKED IN BLUE ON THE MAPS))**

TAKE THE CREEK TURNPIKE TO S. ELM ST. IN JENKS

FOLLOW ELM ST. NORTH TO MAIN ST.

TURN RIGHT ON MAIN ST. AND CROSS THE RAILROAD TRACKS

TURN LEFT ON 1ST ST.

**FOR EACH:**

PARK IN THE LOT AT THE END OF 1ST ST.

USE THE DOORS AT THE NORTH SIDE OF THE BUILDING

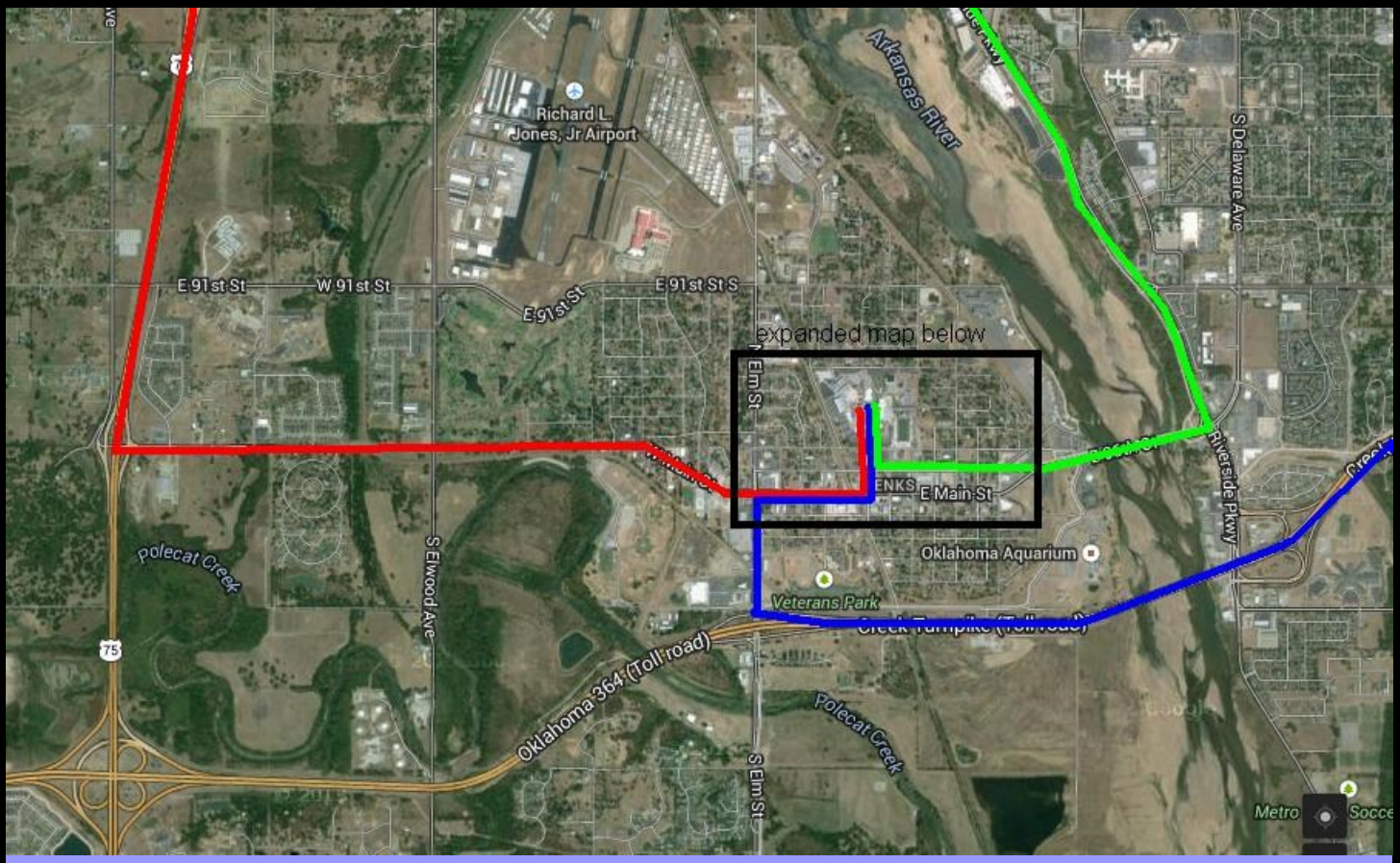
GO UP THE STAIRS TO THE 3RD FLOOR (THERE IS AN ELEVATOR FOR THOSE WHO NEED IT)

TURN RIGHT AND GO DOWN THE HALLWAY TO EITHER SIDE OF THE PLANETARIUM

**MAPS ON NEXT PAGE**

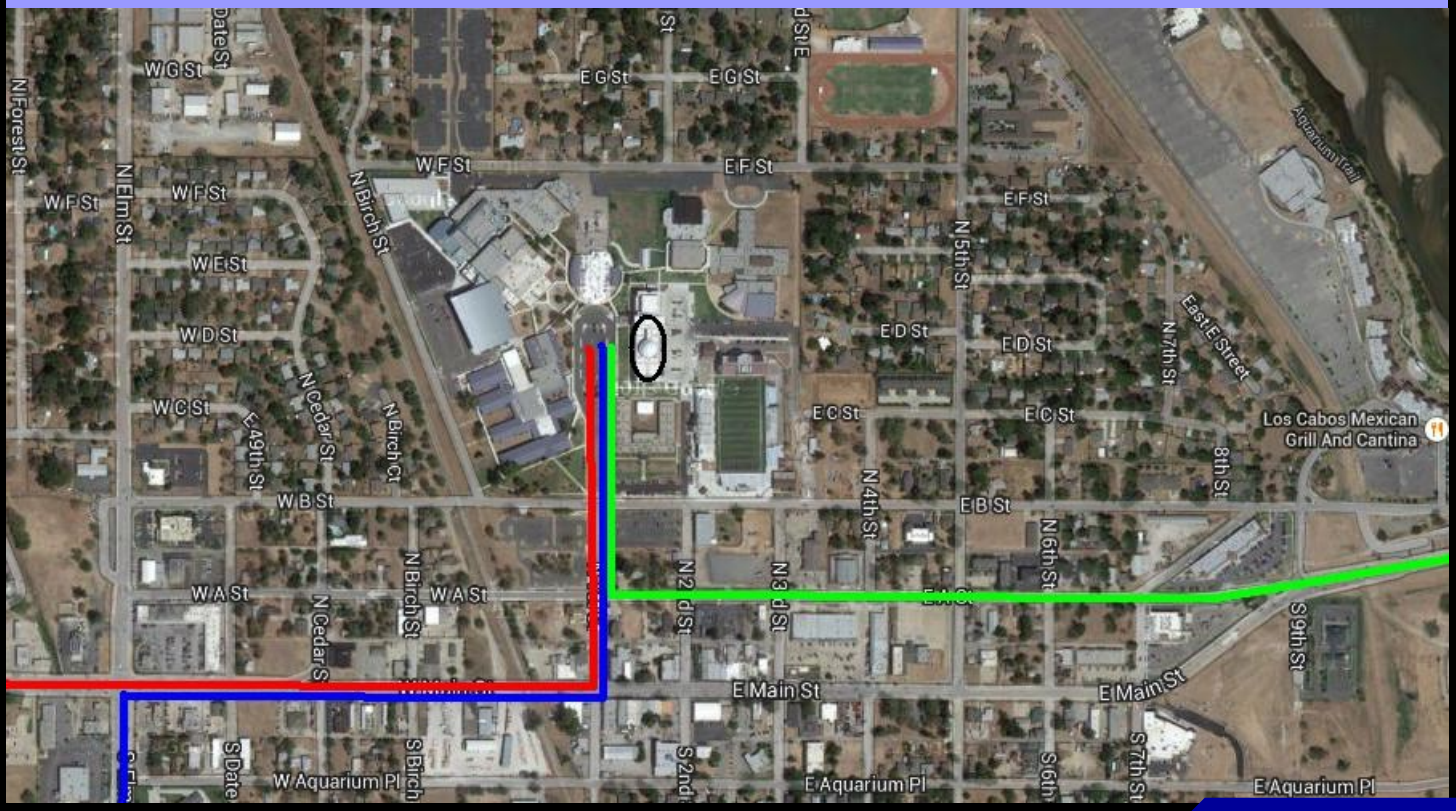
**THE GENERAL MEETINGS ARE FREE AND OPEN TO THE PUBLIC.**

**WE HOPE TO SEE YOU THERE!**




**ABOVE:** DIRECTIONS TO JENKS HIGH SCHOOL FROM CENTRAL TULSA, WEST OF TULSA AND EAST OF TULSA

**BELOW:** MAP SHOWING ROUTE INTO PARKING LOT



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## MEMBERSHIP RATES FOR 2015 WILL BE AS FOLLOWS:

ADULTS - $45 PER YEAR. INCLUDES ASTRONOMICAL LEAGUE MEMBERSHIP.

SENIOR ADULTS - $35 PER YEAR. ***FOR THOSE AGED 65 AND OLDER***. INCLUDES ASTRONOMICAL LEAGUE MEMBERSHIP.

STUDENTS - $30 PER YEAR. INCLUDES ASTRONOMICAL LEAGUE MEMBERSHIP.

STUDENTS - $25 PER YEAR. ***DOES NOT INCLUDE ASTRONOMICAL LEAGUE MEMBERSHIP.***

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## MAGAZINE SUBSCRIPTIONS:

ASTRONOMY IS $34 FOR ONE YEAR OR $60 FOR 2 YEARS.

WEBSITE: www.astronomy.com

SKY & TELESCOPE IS $33 PER YEAR.

WEBSITE: www.skyandtelescope.com

SKY & TELESCOPE OFFERS A 10% DISCOUNT ON THEIR PRODUCTS.

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WE NOW HAVE AN AUTOMATED ONLINE REGISTRATION FORM ON THE WEBSITE FOR NEW MEMBERSHIPS, MEMBERSHIP RENEWALS AND MAGAZINE SUBSCRIPTIONS. JUST SIMPLY TYPE IN YOUR INFORMATION AND HIT “SEND” TO SUBMIT THE INFORMATION. YOU CAN THEN PRINT A COPY OF THE FORM AND MAIL IT IN WITH YOUR CHECK, OR USE OUR CONVENIENT PAYPAL OPTION. .

LINK: http://www.astrotulsa.com/Club/join.asp

OR, IF AT A STAR PARTY OR MEETING, SIMPLY FIND A CLUB OFFICER TO ASK ABOUT JOINING OR RENEWING WITH YOUR DEBIT OR CREDIT CARD THROUGH OUR CONVENIENT SQUARE OPTION!

THE ASTRONOMY CLUB OF TULSA INVITES YOU TO MAKE PLANS THIS WINTER TO JOIN US AT A STAR PARTY!

OPEN TO THE PUBLIC

FOR MORE INFORMATION PLEASE VISIT WWW.ASTROTULSA.COM.

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https://www.facebook.com/AstronomyClubofTulsa

WE ALSO ARE A PROUD PARTICIPANT IN NASA'S NIGHT SKY NETWORK.

THE EDITOR WISHES TO THANK THE FOLLOWING FOR THEIR CONTRIBUTIONS TO THE OBSERVER FOR THIS MONTH:

RICHARD BRADY

TIM DAVIS

TOM HOFFELDER

BRAD YOUNG

NASA'S "THE SPACE PLACE"

PHOTO: Orion rising over an Easy-Up at Okie-Tex 2014. Taken Sep 23, 2014 at Camp Billy Joe, Kenton, OK.

PHOTO CREDIT: TAMARA GREEN

PHOTO: A nice, nearly full Moon, taken at our monthly Sidewalk Astronomy event on Nov 8, 2014

PHOTO CREDIT: TAMARA GREEN