Astronomy 101 for December
Saturday, December 19
6:00 P.M.
(Preceding General Meeting)
Science and Math Learning Center, UNM Campus

We invite all TAAS members and their guests to attend the annual Perihelion Banquet on Saturday, January 23, 2016, at 6:00–10:00 p.m. at the MCM Eleganté Hotel at 2020 Menaul to celebrate our most social event of the year!

New Horizons at Pluto
Dr. Leonard Duda

Free and Open to the Public
The New Horizons spacecraft successfully flew by the Kuiper Belt Object and dwarf planet (formerly planet) Pluto in July 2015. It provided the first close-up images of Pluto and its largest moon, Charon. This presentation by Len Duda will show some of the images of Pluto and its moons returned by the New Horizons spacecraft as it continues on its journey through the Kuiper Belt.

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Our group has had many opportunities to participate in star parties, to observe in diverse venues, and to listen to fine speakers at our monthly meetings—but here is a chance to get to know your fellow amateur astronomers in a totally different atmosphere while dining and enjoying an evening of excellent food and good times. We will have Dr. Pace Van Devender as our guest speaker with a thought-provoking talk on the makeup of dark matter. There will be a delicious buffet dinner, trivia contest, door prizes, awards to outstanding TAAS members, election of officers, a slideshow rolling during the event with 

continued on page 2 . . .
Nominations for
2016 Officers

by Jim Fordice

The TAAS Board of Directors has formed a Nomination Committee that is soliciting nominations for the four officer positions (President, Vice President, Secretary, and Treasurer). The members of the Nomination Committee are Jim Fordice (Chairman), David Frizzell, and Dee Friesen. The committee’s task is to prepare the slate of candidates for the election that will be held during the Perihelion Banquet/Annual Meeting on January 23.

The committee already has one candidate for each of the four positions but wants to be sure there are no other candidates before closing the slate. Please contact Jim, David, or Dee if you have a nomination.

New Address for Membership Mail
Effective immediately, the address for all mail to Treasurer for membership is: TAAS, P.O. Box 50581, Albuquerque NM 87181-0581.

A New Word for the TAAS Vocabulary by Barry Spletzer

The New Horizons mission to Pluto was launched in January 2006, when Pluto was still a planet. After flying through space for a seemingly endless 3,465 days, it reached its destination, forever changing our concept of the now-dwarf planet. In 2006, the year Pluto was demoted, the American Dialect Society voted “Plutoed” as the word of the year meaning to be demoted or devalued.

I am proposing we add a word to our TAAS vocabulary. Before Pluto was Plutoed, before New Horizons left the launch pad, way back in October of 2005, Dan Clark took over as TAAS Treasurer during difficult times. He will be stepping down at the official TAAS officer election during the Perihelion Banquet next month after serving a full 300 days more than it took New Horizons to reach Pluto.

The Treasurer’s job is difficult, continuous, unrelenting and, too often, thankless. In addition to all the financial woes that naturally go with the job, the Treasurer receives membership dues, and thus is the one who keeps membership records and subscriptions up to date.

Dan’s been doing this, quietly and efficiently, for over 10 years, far longer than any serving officer. I propose the word “Clarked” be added to our vocabulary to mean a sustained exceptional effort in getting the job done.

I’d say that New Horizons really Clarked its mission. Next time you see Dan, please let him know how much TAAS appreciates his dedicated and sustained efforts.

New Horizons

The images from New Horizons have excited and confounded the scientists studying them, who have been amazed by the varied surface characteristics that include tall mountain ranges, vast ice-covered plains with little or no cratering, and evidence of glaciers probably composed of frozen nitrogen. The unexpected results may cause them to re-think many hypotheses of moon and planetary formation and evolution.

Learn the answers (to date) to these questions: What’s the energy source for the surface changes? Pluto’s thin atmosphere contains nitrogen and methane; what’s the source of the methane? What are tholins (named by Carl Sagan)?

(Most of the images sent back from New Horizons are through mid-December. The full data transmission process will take about a year because of the amount of data, the low transmission rate due to the spacecraft’s distance and the availability of the Deep Space Network antennas.)

Leonard Duda, PhD, has been at Sandia National Laboratories in Albuquerque, NM, for over 35 years and is currently a staff member in the Fielded Systems Engineering Department.

Outside of his day job, Len has been involved with many volunteer science education activities for over 25 years, including as a volunteer NASA/JPL Solar System Ambassador, an event supervisor for the regional and state Science Olympiad, and master judge chair at the regional science fair.

He is a Grand Awards judge co-chair and a member of the Judging Advisory Committee for the Intel International Science and Engineering Fair (ISEF). Len was the chair of the host committee for the Association of Science-Technology Centers conference in Albuquerque in October 2013 and is currently on the board of directors of the Explora Science Center in Albuquerque, having served two terms as board president.

General Meeting News

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New Horizons
November 7 Third Quarter Observing Session:
Twenty people attended the November 7 Observing Session. The wind was higher than forecast with 21 mph at 4:00 p.m. As the night went on the winds subsided. By the time Jeff Boggs closed up the field at 1:00 a.m. there was no wind and the sky was clear.

George Friedman and Will Ferrell used the GNTO 16” Dobsonian. George also used his 6” refractor. Viola Sanchez used the 10” GNTO Dobsonian. Fernando Torres brought out the Loaner 13” Gray Truss Tube Dobsonian. Willie and Trista Marchetto were using the Loaner 12” Meade Lightbridge. This loaner scope has very smooth motion and good optics, too. They had a friend with them, Kirk Landin. Edward Fisher was there with his 10” Orion Dobsonian. Sigrid Monaghan brought her 6” SCT. Bill Wallace was also in attendance.

Hy Tran was doing some imaging and had brought Ilias, a visiting French student. Kevin McKeown was trying out his Cave 8” Dobsonian. It is a nice scope with lots of history built in to it.

Alan Scott and Jim Lawrence had a line of people looking through Alan’s 20” Dobsonian and Jim’s really cool 12” Binocular Dobsonian. Two eyes are better than one! Dave and Maya Walz-Burkett were using their 12” Orion Dobsonian. Jeff said he wishes his Dad had had a 12” telescope when he was growing up.

I showed up after making sure the Lobos had won their football game. I made good progress on the Herschel 400 list. Ira Strong finally made it to the field after dark and she enjoyed looking through all the scopes. Thanks to Karen Keese for helping Ira find the field. Jeff had his 20x80 Binoculars mounted on his Peterson Engineering EZ binocular mount. M31 is nice with the wide field of view the binoculars provide.

Jeff mentioned some great reasons for coming down to GNTO: The Taurid meteor shower (we saw several nice ones), dark-sky objects, decent skies, good company, everyone having a good time, and a big surprise at 7:00 p.m., not planned or anticipated. The surprise was a large glowing dome of light in the western sky. It lasted about 30 minutes. It was very big and everyone was out looking at this very unusual sight. Later in the evening, Alan Scott did a Web search and it was found to be a submarine-launched ballistic missile from way over in the Pacific Ocean. We felt we were all lucky to see such special event.

GNTO is the place to be for the usual and the unusual. Coffee, cookies and a warm Cocina were all very popular.

November 14 New Moon Observing Session:
Will Ferrell arrived at 3:30 p.m. to find Ray Collins putting in the “piazza.” This is a lovely brick porch outside the Cocina. No more dangerous step-down while exiting the Cocina! Wonderful innovation! Going inside the Cocina, one is immediately struck by the colorful fabric on the kitchen chairs. This was Ina Collins’ work. Ina is Ray’s wife. The chairs bring a hominess to the room making it inviting and cozy. Many thanks to Ina for her wonderful improvement to GNTO.

Pete Eschman arrived and, with Bill Wallace’s help, fixed the shelf near the Isengard in the Main Dome. This volunteer work sometimes goes unnoticed but makes a huge difference in maintaining a great facility.

There were 12 scopes and 20 people at the event. We had no wind and clouds only around the southern and western horizons. Will was gratified to see a number of people working on the TAAS 200 Scavenger Hunt. Will was even complimented about it.

We had a 10% waxing moon that set before 8:00 p.m. For some the light dome from Albuquerque was particularly annoying. The Draco Edge-On Galaxy from the TAAS 200 was in the muck even though it was maybe 20 degrees up from the horizon when Will searched for it. Is the light dome growing?

After midnight the clouds increased in the west gradually covering the southern and western parts of the sky. I was the last observer and left shortly before Will locked the gate at 1:15 a.m.

GNTO Committee Update:
The GNTO Committee met on November 12. The committee is very busy with a number of important projects. We can always use more members to assist with these exciting and important efforts.

- Messier Marathon: We are looking to hold the marathon in early April and are considering holding a breakfast as part of the event.
- Signage Improvement Project: We have completed this project. Don’t hesitate to tell the opener if you have difficulty finding your way on and/or off the site. Thanks to Mike Molitor and Dan Rossbach for making this project a success.
- Gasoline and Propane Storage: Marshall Gatten and James Carr are working on a project to install a cage to store gasoline and propane.
- Documentation: Dave Downs is leading a project to update and expand GNTO documentation.

New Projects for 2016:
- Emergency Flashing Lights: Mike Fuge is leading this effort to install lighting to make it easier for medical responders to locate GNTO in the dark.
Three November Images by John Laning

While making this first image, I found I have not learned how to use my new reducer lens at f/5.25 and I need to better align my finders. So instead of most of the North American Nebula (NCG7000) I only got part of Mexico. Also, I tripped over the USB data cable; luckily I had a rock holding down the cable to the hub and only lost five minutes of imaging time. It was a little chilly, 30°F at dusk. I processed the final image using false color method from Astronomy Tools. The size is over two degrees and about 1,600 light-years away.

Exposure: 24 x 5 minutes for 2 hours total, all through a Hydrogen Alpha filter with a 7 nm passband.

11/22/2015 7:00 to 9:15 p.m.

Next I tried to find and image a Sharpless Object, I chose Sh2-119 near the North American Nebula and M39. The region seems to have a few dark nebulae and dim emission nebulae. The object size is listed as 160’ so I did not get the whole area. The only problem I had was somehow I hit the subframe button in CCDSoft and lost 10 minutes of images. The distance may be about 4,500 light-years away if 68 Cygnus O7IIIn is the ionizing star.

Exposure: 30 x 5 minutes for 2.5 hours total all through a Hydrogen Alpha filter with a 7 nm passband.

11/23/2015 6:30 to 9:15 p.m.

The final image is of IC5146 know as the Cocoon Nebula, also located in Cygnus near M39. I fell asleep during the last 3 images, but I lucked out. Everything worked. When I looked outside there were thin clouds but Cygnus was mostly clear. These 3 images were all done with nearly a full moon. It shows that even a full moon will not slow a determined astrophotographer. The size is 10’ and distance about 3,300 light-years.

Exposure: 24 x 5 minutes for 2 hours total, all through a Hydrogen Alpha filter with a 7 nm passband.

11/24/2015 7:00 to 9:15 p.m.

Data common to all 3 images

Equipment: ES ED127CF f/7.5, iOptron CEM60 mount, SBIG ST8300M with FW5, Guider SBIG SG-4 on an AT72ED f/6.


Location: 3 miles north of Oak Flat on my backyard patio at 7,300 feet in elevation.
Navajo Elementary School Star Party

by Trish Logan

What a great time we had at Navajo on November 17! Several of us got together early to do some “playing” with the remote control for the planetarium. Included in the training were Trish Logan, Judy Stanley, Dr. Dan Klinglesmith, Tom Graham, Bob Hufnagel, and Danny Russell.

About 150 people enjoyed the planetarium during the four presentations under the dome. Outside at the telescopes were John Laning, Bob Hufnagel, and a teacher from Navajo. It was really cold, but everyone enjoyed the beauties in the sky.

Tom Grzybowski did a wonderful job training the families about comets.

Altogether, it was a very successful evening for our TAAS volunteers and the families and staff of Navajo Elementary School.
The Sidereal Times

December 2015

by Jim Kaminski

ON MONDAY, DECEMBER 7, 2015, I was able to see my second occultation of Venus by Luna (my first was reported in the Sidereal Times, September 2012, p. 6). Only a thin crescent moon and some scattered clouds made it hard to initially locate, but Venus was readily seen with the naked eye. As before I used an 80mm refractor, but this time I used a zoom eyepiece (24–8mm) to be able to easily adjust the magnification depending on viewing conditions, as well as a teal filter for contrast enhancement. Venus was a little more than 1/2 illuminated. I was able to get the WWW audio time signal using a small shortwave radio (Eton model E100) tuned to 10 mHz, recorded it on a small digital voice recorder (Olympus model VN-4100), then graphically picked the time using some simple software (Audacity) on my Mac.

Some other details:
location = Albuquerque, NM (35°11’N, 106°30’W, 6190 ft. elevation)
in shade under a covered patio, viewing overhead and to the west
weather = scattered clouds, 42-45°F, 1–3 mph wind
Seeing = above average / no image ripples at 70x
Magnification used = 70x for disappearance, 35x for reappearance
local time = 9:34 to 11:21 AM (MST)
disappearance = 16:34:51 UTC (as a very small point of light)
1st reappearance = 18:20:11 UTC (as a sliver of light)
reappearance = 18:20:59 UTC (Venus clear of Luna)

It was impressive to see Luna approach Venus, and then overtake it. Trying to see Venus reappear was somewhat tedious because the sky was bright, the exact spot was not known, and the eye tires. Since the dark side of Venus was first to disappear so it must also be the first to reappear—meaning that a broad swath of Venus is what first I saw. (My eyes were not good enough to see the two “points” of a gibbous Venus reappear, as is theoretically what happens.)

This was an enjoyable event for me. I understand that a Lunar occultation of Venus occurs every year somewhere on Earth, but I was not able to determine when the next one will occur for this area (perhaps 12/12/2020 ?).
Solar Astronomy Outreach (SAO) 2015 Report

by Roger Kennedy

Since the SAO function was added to the TAAS outreach effort five years ago, the program has been extremely popular with community organizations and schools in New Mexico and in other states (AZ, CO, NY, PA, WA,). Each year, the number of events scheduled has increased. This year’s itinerary comprised 204 programs with over 31,000 adults and children attending while traveling over 8,000 miles. Over the past five years, SAO volunteers have interacted with 120,000 adults and children during 7,000 hours of volunteer time at 800 events including over 60 schools. Our educational materials have been downloaded and used as curriculum or outreach resources in USA classrooms and astronomy organizations and/or schools around the world.

SAO has developed ongoing programs with the National Park Service (Petroglyphs, Bandelier, El Malpais, and Valle Caldera), NM Natural History and Nuclear Museums, ABQ Botanic Garden, NM STEM Initiative, and Albuquerque and Santa Fe Library Systems.


Dancing Galaxies

by Samantha E. Andrews
Senior, East Mountain High School

Although an exciting phenomenon, colliding, or merging galaxies are actually quite common within our universe. The scale of this beautiful, celestial dance is not just our little solar system colliding with another solar system. Instead, it is a huge galaxy colliding with another huge galaxy at more or less 300 km/sec. But how do we know anything about colliding galaxies? Why do galaxies collide? What happens when they do? And what is the fate of our dear Milky Way Galaxy?

Since most things in space take millions of years to occur, it is somewhat frozen in time. Two galaxies can take millions of years to fully merge into one. So, obviously, we cannot simply point a telescope at two galaxies and watch for a few minutes to see what happens. Instead, scientists can look at various phases. In 1972, the Toomre brothers, used a supercomputer that allowed them to create a large collection of simulated masses and see how they would behave. By 1977, they had sorted known galaxy pairs into phases known as the Toomre sequence (Figure 1).

Today, researchers can find different sets of colliding galaxies, each at a different phase, and combine this data to make a complete picture. Hubble has images of two galaxies just before they touch. Next comes the collision with an image of one galaxy penetrating the other. A snapshot of the first pass follows this, where the galaxies have now ripped through each other. They then return to each other for a second pass and finally merge into one galaxy (Figure 2).

To gain even more accurate detail, NASA’s Spitzer Space Telescope observed in infrared light, while NASA’s Galaxy Evolution Explorer spacecraft observed in ultraviolet light. By using the two different wavelengths, scientists were able to see dust heated by the new stars and emissions from them. Combining these data with mass, gravitational forces, hydrodynamics, the dissipation of interstellar gas, star formation, and the mass and energy released by supernovae, supercomputers have been able to come up with simulations showing what occurs over millions of years in just a minute.

It is a well-known fact that our universe is expanding. Everything is moving away from everything else much like a balloon with dots drawn on it being blown up. But if everything is moving away from everything else, then how are galaxies colliding? The answer is simple. Gravity holds galaxies and galaxy clusters together. These do not expand with the space. Super clusters, however, are not held together by gravity. These are large enough that they will eventually spread apart due to the expansion of space.

Merging galaxies have played a major role in the formation and growth of clusters of galaxies. Irregular galaxies will form clusters. In these clusters some will continue to merge and form quasars. Quasars will merge to form radio galaxies or blazars, and some will form Seyfert galaxies (Figure 3). Others will quiet down into normal galaxies.

As galaxies approach each other, their gravity creates tides that distort their shapes. Gas and stars are pulled from their orbits, and sometimes simply thrown from the galaxy. Since space is so vast, it is extremely unlikely that any two stars will actually collide. The gas and dust interacting within the merging galaxies causes a burst of new stars being born. Depending on the gases of each galaxy and its redshift, new star formation can reach thousands of solar masses per year. To put this in perspective, the Milky Way forms stars at the rate of one solar pass per year. During this time the galaxy’s supermassive black holes will begin to orbit each other. Changes in the gravitational pull will send gas and stars into the black holes never to be seen again. Once they finally merge it is...
...Dancing Galaxies continued from page 8

likely that the gas will create an extremely luminous quasar or active galactic nucleus in the newly merged galaxy.

In our very own Local Group we have about a dozen dwarf galaxies, Andromeda, the Triangulum Galaxy, and our very own Milky Way. Since Andromeda is 2.5 million light years away and moving at a rate of 68 miles per second, it is calculated that it will hit us in about 4 billion years. Scientists measure the motions of galaxies based on background objects. For example, Hubble chose an area in Andromeda's halo where stars in Andromeda could be seen as well as background galaxies. Andromeda's stars, relative to the background objects, have a transverse velocity, which means it is moving towards us. However, if it is transverse enough it may just simply pass by us. Analogous to other galaxy collisions, the first pass between to the galaxies will reshape their beautiful spirals. Stars and dust will be thrown around. Due to low gas content, it is likely that not many new stars will be born compared to other collisions. After a few more passes, the two galaxies will finally collide and become one, elliptical galaxy. This new elliptical galaxy will, rather unfortunately, be called Milkdromeda. It is possible that in the even further future the Triangulum Galaxy will join Milkdromeda. During the merger, Earth will have new, epic views of the sky (Figure 4)

As for our dear solar system, the worst-case scenario is that our Sun gets thrown out of its orbit and into a tidal tail or into the center. Most likely, however, our little solar system will stay intact and be just fine. It may be relocated further away from the core or potentially thrown out all together. Either way mankind need not fear for by then Earth's surface temperature will be too hot for liquid water to exist and all terrestrial life will have ceased due to the Sun's luminosity.

Figure 4. Present-day view of the sky to 7 billion years from now. Credit: NASA, ESA, the Hubble Heritage Team (STScI/AURA)-ESA/Hubble Collaboration and A. Evans (University of Virginia, CharlottesvilleNRAO/Stony Brook University). https://www.spacetelescope.org/news/heic0810/

Bibliography


New Weather Station:

We recently installed a new Davis Weather Station at GNTO. The GNTO weather Web page has been updated to show the new weather station readings. You can find a link at the bottom of the GNTO Web page on TAAS.org or go directly to it at http://complex.org/~gnto/.

The information provided by the weather station can be adjusted to suit our needs. Please take a look and send any comments you have to GNTO@TAAS.org.

Upcoming Events:

- January 2: Third Quarter Moon Observing
- January 9: New Moon Observing
- January 30: Third Quarter Moon Observing

Don’t forget that the GNTO Observing Field is available for use by TAAS members anytime. Check the TAAS website for the procedure to follow. Contact me if you have any questions.

As always, check TAAS_Talk and the TAAS website for last-minute changes and updates. GNTO events are open to all TAAS members and their guests.

GNTO Director: GNTO@TAAS.org or 505-803-3640.

...Under the Dome continued from page 3

- Security Alarm System: Jim Fordice and Pete Eschman are working to install a security alarm system for the GNTO buildings.
- Weather Station Mast: We are starting to plan for the installation of a taller mast for the weather station and other capabilities.
- Pellegrino Telescope Tube: Dan Rossbach is leading an effort to display an optical tube we recently received from Judie Pellegrino. This is a tube George Pellegrino used and features signatures from Alan Hale, Robert Evans, Clyde Tombaugh, and John Dobson.

The Sidereal Times December 2015

The Official Newsletter of The Albuquerque Astronomical Society
TAAS Board Meeting  
Thursday, October 22, 2015  
Minutes

Attended by: Jim Fordice, Lynne Olson, Bob Anderson, Roger Kennedy, Bob Havlen, Stephen Snider, Sigrid Monaghan

Absent: Trish Logan, Mike Molitor, Dan Clark, David Frizzell

Guest: Thaddeus LaCoursiere (NMMNH&S)

I. Approval of Agenda - No additions made to the agenda.

II. Approval of Minutes - Two minor changes made to the August 2015 Minutes and the September 2015 Minutes. Motion to approve the minutes raised and seconded.

III. Committee Reports

A. Education - Night/Day Trish Logan (Nighttime) and Roger Kennedy (Solar).
Trish’s report sent via e-mail:
· We are fully booked for this school year with 9 schools on the waiting list for the 2016–2017 school year.
· Still working on a date and location for planetarium training.
· Ernest Stapleton donated $150 to TAAS for the star party on 10/20/2015
· Suggestion to move the planetarium equipment to a climate controlled unit. Cost would be $86/monthly.

Discussion. Find a possible climate controlled unit to hold all the TAAS equipment/supplies instead of renting a second unit just for the planetarium.

Motion. Authorize Trish to rent a 5 x 5 climate control unit for the minimum rental time while looking for a larger unit to store all TAAS equipment. $86/month to be paid from Education Funds. Motion seconded and passed.

Roger Kennedy, Solar Outreach Report:
Nineteen events in September, 170 events YTD, 205 events scheduled so far for 2015. Roger has applied for a $5,000 grant from A I Pierce but has not heard back so far. The Lunar Eclipse Event was very successful with over 1,300 visitors. Roger thanked everyone who volunteered and participated.

Roger presented a written report on the 5-year evaluation. A motion was made to accept the evaluation. The motion was seconded and passed.

Recommendations made:
· SAO should continue providing programming and seeking support funding for materials.
· Requests for programs will be evaluated based on limited, available volunteer support.
· Notification of significant events should be dispensed through TAAS Talk. Events of general interest could be included on the front page of the TAAS website.
· The SAO page/link of the website should be maintained. A full calendar of events will appear on this page.

Comment: For liability reasons, all SAO events done outside the State (NM) will not be considered TAAS Events.

B. Finance - Dan Clark (not present but report submitted). Comments: The written report lists the “Cosmic Carnival Fund” but it should say “Solar Outreach”. The exact amounts in the fund have come into question and will be reviewed with Dan at a later date.

C. GNTO - Jim Fordice. Written report submitted including budget spreadsheet. The AED battery supply was exhausted and Jim has contacted the manufacturer for a replacement which will cost $325.30. This will come out of the General Fund. AED Training is rescheduled for December 12, 2015. A new weather station has been purchased which will work wirelessly. Upcoming projects: Cocina Entry Platform; Outhouse Floor Improvements; ROOst Heater Replacement; Security Alarm System. Motion made to approve the budget for 2016 as submitted. Motion seconded and approved.

D. Membership - Bob Anderson. Nine New members added for October bringing the membership total to 375. Fifteen renewal membership letters were sent out.

E. Publicity/Special Events - Lynne Olson. Dee Friesen will again be hosting the “Fabulous 50” Star Party Event at his house in November but is looking for a Volunteer to take it over. The Cosmic Carnival will be joined by a star party in the evening. Daytime event is from 1:00–5:00 p.m. and the Evening event will be from 6:00–9:00 p.m. Currently there are 10–11 exhibitors planning to come.

IV. End-of-Year Activities. Mike Molitor and Gordon Pegue head the committee for awards. Nominations team consists of Jim Fordice and David Frizzell. Current nominations include for President, Secretary, and Treasurer. For the
Banquet committee, Lynne Olson has already procured some volunteers. Stephen Snider will be Master of Ceremonies. David Frizzell will find a speaker. Bruce Myers will be in charge of the prizes. Motion raised to stay with the same budget of last year ($500) for the Perihelion Banquet prizes. Motion seconded and approved.

V. New Business - With the success of October’s Placitas Star Party, the library is open to having additional events next year in April, July, and October.

VI. Adjourn

The election of Officers for 2016 will be held during the Perihelion Banquet, January 23, 2016.

Account Summary, November 2015
by Dan Clark, Treasurer

Total Funds on Deposit:

<table>
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<th>Current</th>
<th>Previous</th>
<th>Change</th>
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Totals:

General: $6,989.87
GNTO: $7,856.27
Education: $7,296.76
Dark Sky: $2,078.32
Science Fair: $50.00
Special Projects: $742.23
Solar Outreach: $61.45
Astro League Dues (not in total): $390.46
Investments Wells Fargo (included in total): $10,000.00

Major Revenue

Total: $1,525.13
Memberships: $485.00
Donations: $310.00
October Interest: $0.13
Equipment Sale Loaner Scope: $730.00

Major Expenses

Total: $1,785.08
Storage Unit: $171.00
D. Frizzell Speaker Exp.: $100.40
Road Maintenance: $200.00
Ray Collins/GNTO: $988.38
J. Fordice AED Battery: $325.30

Free and Open to the Public
Saturday, December 21, 7:00 P.M.
UNM Science and Math Learning Center

New Horizons at Pluto
Dr. Leonard Duda

Astronomy 101
Get To Know Your Neighborhood—Observing the Moon
6:00 P.M.
Welcome to New or Returning TAAS Members

Julia Arnold
Gwinn Hall
Ann McGough
Susan Stark

Donations to TAAS

GENERAL
Ann McGough

EDUCATION
Ernest Stapleton PTA

GNTO
Paul Lin

The Albuquerque Astronomical Society is a 501(c) (3) organization. Donations are deductible as charitable contributions on the donor’s federal income tax return.

Location, Location, Location

• Chaco Canyon•
6185’ elevation
Latitude  Longitude
36˚ 01’ 50”N  107˚ 54’36”W
36.03’  -107.91’
36˚ 1.83’  -107˚ 54.60’

• Oak Flat•
7680’ elevation
Latitude  Longitude
34˚ 59’ 48”N  106˚ 19’ 17”W
34.99’  -106.32’
34˚ 59.80’  -106˚ 19.28’

• UNM Campus Observatory•
5180’ elevation
Latitude  Longitude
35˚ 5’ 29”N  106˚ 37’ 17”W
35.09’  -106.62’
35˚ 5.48’  -106˚ 37.29’

For security reasons, GNTO location is available by request only, so please contact Jim Fordice, GNTO Director, for GNTO information.

Explanation of Dues and Membership Renewal Date

NEW MEMBERSHIPS will be posted as beginning the first day of the month regardless of what day during that month the check is received. Notice of renewal will be sent out the month before the due date. You will have until the end of the month after your renewal date to send your membership check.

If you fail to pay and renew at that time, your membership will lapse. When you pay on a lapsed membership you will be reinstated in the month that the membership was originally due. (If dues were due in March and you did not renew until May or June or July etc., the date of your renewal will be in March. If your dues are due in April and you pay in March, your membership will still be renewed in April.)

In a nutshell, if you pay late or early your membership date stays the same and your next year’s dues will be due on that date next year.

—Dan Clark

Monthly Membership Report
November 2015

<table>
<thead>
<tr>
<th>Membership</th>
<th>Current Month</th>
<th>Past Month</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular</td>
<td>268</td>
<td>264</td>
<td>4</td>
</tr>
<tr>
<td>Family</td>
<td>77</td>
<td>76</td>
<td>1</td>
</tr>
<tr>
<td>Education</td>
<td>13</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Military</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total Paid</td>
<td>359</td>
<td>354</td>
<td>5</td>
</tr>
<tr>
<td>Honorary</td>
<td>7</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Complimentary</td>
<td>14</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>Total Members</td>
<td>380</td>
<td>375</td>
<td>5</td>
</tr>
</tbody>
</table>

Editor’s Note

The deadline for the next issue of The Sidereal Times is Friday, January 8. The newsletter editor’s e-mail address is editor@TAAS.org

Text: E-mail text as an attachment, preferably in Microsoft Word or compatible format.

Photos: Caption and credit needed. Attach photos or graphics in separate graphics files. Photos or graphics in Word files are no longer acceptable.

Contact Bob Anderson at membership@TAAS.org

P.O. Box 50581
Albuquerque, NM 87181

The Official Newsletter of The Albuquerque Astronomical Society
## 2015 TAAS Board of Directors/Staff

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<thead>
<tr>
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<td>President</td>
<td>Steve Snider</td>
<td><a href="mailto:president@TAAS.org">president@TAAS.org</a></td>
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<tr>
<td>Vice President</td>
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<tr>
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MEMBERSHIP: You may request a membership application by sending e-mail to membership@TAAS.org. Applications may also be downloaded from the Web site. Annual dues to The Albuquerque Astronomical Society are $30/year for a full membership and $15/year for a teacher, student (grades K-12), or military membership. Additional family members may join for $5/each (teacher, student and family memberships are not eligible to vote on society matters). New member information packets can be downloaded from the Web site or requested from the TAAS Membership Services Director at membership@TAAS.org. You may send your dues by mail to P.O. Box 50581, Albuquerque, NM 87181-0581 with your check written out to The Albuquerque Astronomical Society or give your check to the Treasurer at the next meeting.

MAGAZINES: Discount magazine subscriptions to Sky and Telescope and Astronomy as well as discounts on books from Sky Publishing Corporation are available when purchased by TAAS members through our society. Include any of the above magazine renewal mailers and subscription payments as part of your renewal check. Make checks out to TAAS (we will combine and send one check to the publisher). Warning: publishers take several months to process magazine subscriptions.

NEWSLETTER ARTICLES/ADVERTISEMENTS: Articles, personal astronomical classified advertisements and advertisements for businesses related to astronomy must be submitted by the deadline shown on the Society calendar (generally the Friday near the new Moon). Rates for commercial ads (per issue) are $120 per page, $60 per half page, $30 per quarter page, $7 for business card size. The newsletter editor reserves the right to include and/or edit any article or advertisement. E-mail attachments in Microsoft Word or compatible word processor format; ASCII and RTF are acceptable. One space between paragraphs is preferred. One column is approximately 350 words. Contact the Newsletter Editor at editor@TAAS.org for more information.

Note that the Sidereal Times is no longer mailed. It is posted on the TAAS Web site, www.TAAS.org.

Send submissions or correspondence to editor@TAAS.org.

TAAS ONLINE

TAAS Web site: http://www.TAAS.org

The TAAS Web site includes:

Programs
• TAAS 200
• TAAS Fabulous Fifty
• Educational Outreach: School Star Parties, Solar Astronomy Outreach
• Equipment Trader
• Telescope Loaner Program
• Telescope Making and Maintenance and more
• Online Sidereal Times
• Calendar of TAAS Events
• Members’ Guide
• Links to Astronomy Resources and Members’ Blogs

E-mail: TAAS@TAAS.org
Members’ Google Group: TAAS_talk@googlegroups.com

TAAS is honored to receive an “Editor’s Pick 2013 Best of the City” award from Albuquerque Magazine.

BEST PLACE TO STARGAZE
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