

## President's Message - April 2012



Aaahh, April. It brings longer days, shorter nights, warmer weather and just a wee bit of dust. As we say "goodbye" to our old friends Orion, Taurus and the other winter constellations, we can start saying "hello" to the spring and summer stars. We even lose Jupiter, but Saturn is rising earlier and earlier.

March and April have already been somewhat busy and there are more things headed our way. On March 31 we held a "Music and the Stars" at Aguirre Springs campground. Local musician Daniel Park gave his usual, extraordinary performance, playing guitar and violin and singing songs from Otis Redding to Lady Gaga. About 50 people showed up for the music and a catered barbeque dinner, followed by several ASLC members showing off their astronomical knowledge. It was a very windy night (we had to tie rocks to Jerry McMahan's legs so he wouldn't fly away), but

beautiful skies. Please see Jerry's article in this edition of the HDO for more details.

On April 22, we had Earth Day at Young's Park and on April 23 some of us participated in judging the Mayfield High School Science Fair. On May 3 we will host a solar party at Mesilla Elementary and, of course, on May 20 is the Annular Eclipse. I know a few of us will be heading up towards Albuquerque to see "annularity" (see page 8 of the January issue of the HDO for an image of an earlier annular eclipse), and it should be a great showing here in Las Cruces, with the Sun being over 90% covered by the Moon.

In a total solar eclipse, the Moon has the same or slightly larger apparent diameter than the Sun, so the Moon blocks the entire Sun, providing a view of the corona and other effects. With an annular eclipse, the Moon is slightly farther away from the Earth so does not cover the entire solar disc. This configuration allows us to see an "annulus" (ring) around the Sun. The ASLC is planning a public star party (tentatively to be held at Veteran's Park on Roadrunner Parkway). Details will be given at the April 27 general meeting. We are also planning a Las Cruces viewing of the Transit of Venus on June 5.

The Board of Directors held a meeting on April 17 and some of the key points will be announced at the April meeting as well. We discussed the FY 2012 Budget, Loaner Telescope Program and other topics of importance.

We are still waiting for architectural drawings for our upcoming Leasburg Dam Observatory and we are still hoping for groundbreaking in May of this year.

The ASLC is still looking for a chair of our Fund Raising Committee. The Chair should have experience in writing grants and in general fund raising activities. Please contact me if you are interested. We will be working towards raising the necessary funds to add equipment to the new Observatory, including a CCD imaging system, computers, etc.



The Astronomical Society of Las Cruces (ASLC) is dedicated to expanding public awareness and understanding of the wonders of the universe. ASLC holds frequent observing sessions and star parties and provides opportunities to work on club and public educational projects. Members receive the High Desert Observer, our monthly newsletter, membership in the Astronomical League, including AL's quarterly A.L. Reflector. Club dues are \$30.00 per year, including electronic delivery. Send dues payable to ASLC with an application form or note to: Treasurer ASLC, PO Box 921, Las Cruces, NM 88004

ASLC members are entitled to a \$10.00 discount to Sky and Telescope magazine.

### ASLC OFFICERS, 2012

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## Next Meeting

Our April meeting will be held on Friday, April 27, in Room 77 at Doña Ana Community College, starting at 7:30 p.m. Do not forget that Show and Tell will start at 7:00 p.m.

This month's speaker is Dr. Beth O'Leary, Associate Professor, NMSU Department of Anthropology. Her presentation will be the "U.S. Lunar Lander Sites". Dr. O'Leary will discuss her plans to turn these sites into National Landmarks, which would preserve them in the event of commercial development on the Moon. Sounds like a very interesting presentation.

## Events

ASLC hosts both a deep sky viewing and imaging at our dark sky location in Upham and a public in-town observing session for the public at the International Delights Cafe. Both sessions begin at dusk. We also frequently provide solar observing at the Farmer's Market on Saturday mornings. For information on these and other events, please see <http://www.aslc-nm.org>.

## Outreach

Outreach is a very important ASLC activity. We can always use more volunteers to help educate the public. Even if you do not have a telescope, we can always use more members to help answer questions at the events and point out constellations in the sky.



## President’s Message – April 2012

(Continued from Page 1)

Don't forget we still have plenty of apparel for sale, including hats, t-shirts (short- and long-sleeved), hoodies and denim shirts. Please talk to Ann McPhee if you're interested in purchasing any of this gear.

I hope to see you at the April 27 meeting, starting at 7:00 p.m. "Show & Tell" starts at 7:00 p.m., and the business meeting begins at 7:30 p.m. Our guest speaker this month is Dr. Beth O'Leary, Associate Professor, NMSU Department of Anthropology. Her presentation will be "U.S. Lunar Lander Sites" and she will discuss her plans to turn these sites into National Landmarks, which would preserve them in the event of commercial development on the Moon. Sounds like a very interesting presentation. I hope you can join us.

Your President,  
Ron J. Kramer

## Late March Outreach Activities Roundup

By Jerry McMahan

### NMSU Astronomy Department Open House - March 30, 2012

The Astronomy Department held their open house and the society participated in the event. Society members included Steve Shaffer, Chuck Sterling, Tracy Stuart and Jerry McMahan. Steve opened the dome, pointed the ‘scope at the Moon, and closed the dome when we finished. Chuck gave instructions to observers on how to approach the eyepiece to get the Moon into view. His method was much better than my usual just fishing around for the sweet spot. He told them to start away from the eyepiece and then move in closer when they had the object in view. I bored Tracy with my comments on what is wrong with education today, and Tracy participated by pretending to be interested in my stories.

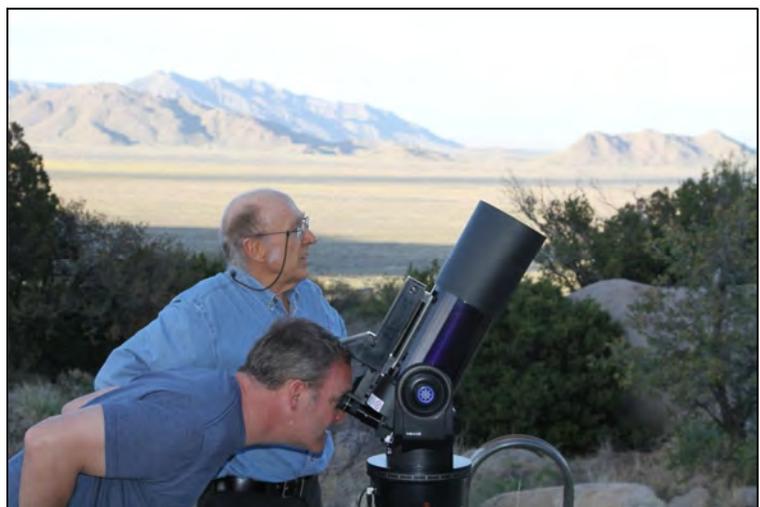
During the last couple of open houses, we had good results in tracking the Moon, but not with higher magnifications on planets. Steve discovered that when the magnetic counter weights that are attached to the bottom of the tube were removed, the tracking improved. It worked well on Mars, other than the fact that the seeing was not good when we tried it. Earlier, we had pretty good views of the Moon.

### Aguirre Springs - March 31, 2012

The “Friends of the Organ Mountains” held an evening picnic, music and observing session at the park. Society members Ron Kramer, Trish Conley, Tracy Stuart and his wife Loretta, Phil Simpson and his wife Patty, Sidney Webb, and Jerry McMahan were in attendance with telescopes and binoculars.

Ron gave directions to reach the site. He warned that it was a very winding road. He should have said that it was a **very, very, very, winding road!!!!**

The food was good as was the entertainment. The singer was Ron and Trish’s friend Daniel.





I don't remember Daniel's last name, but I think I heard it said that he was going to appear on the "America Has Talent" television program.

The observing session went well, between the strong gusts of wind. The wind was not continuous, but there would be sudden gusts strong enough to knock

chairs down. Despite the Moon and being close to the base, the sky was surprisingly dark. I was surprised to see that we had a clear view of Jupiter and Venus with the mountain on the west side.



### Moongaze - March 31, 2012

Our monthly Moongaze was held, at the International Delights, on the same night as the Aguirre Springs program. We had both events covered. Society members covering the Moongaze included Steve Shaffer, Chuck Sterling, Daniel Giron, and Ken and his wife Judy from El Paso. Chuck brought both his 10-inch and his 100-mm Orion refractor.

The objects we observed included Jupiter, Venus, the Pleiades, Mars and the Moon. Near the end of the program Steve noted that Saturn had cleared the building, so the first Moongaze view of the planet, for this year, happened that night.

## Review of the iOptron SmartStar A "Cube" Mount.

By Brian D. Ottum, Ph.D.

### Introduction

This is a review of the iOptron SmartStar A mount. I purchased the mount for \$422 (including delivery) from Amazon in January of 2012. The purpose of the purchase was to get a lightweight "grab-n-go" mount that has a motor drive. Not having a motor drive became a real problem when I was showing hundreds of people solar prominences last summer (while I volunteered at Bryce Canyon National Park). I would have to take the time to nudge the scope between visitors, often butting heads with the overly eager. The need for a drive will be critical this spring when I return to Bryce to help serve the crowds of visitors viewing the May 20 annular solar eclipse and the June 5 transit of Venus.

In nearly 40 years of serious observing, I've owned many scopes. Pertinent to this review, I have a GO TO Starmaster 14.5-inch and a GO TO Gemini drive system.





Before purchasing, I did extensive Google searches and read many reviews and experiences with the various iOptron “Cube” products and their derivatives. Being a *Sky & Telescope* “Product of the Year,” the Cube has generated a lot of interest and sales. It offers a lot of technology for a low price. However, the reviews are decidedly mixed. Folks complain about shaky tripods, poor documentation, buggy software and poor pointing accuracy. To be fair, many folks deal with the negatives, modify the mount and become enthusiastic supporters.

Out of the many iOptron mount options, I picked the SmartStar A because it is the lightest, and also has the unique ability to tilt up and emulate an equatorial mount. It could possibly replace the AstroTrac 320 lightweight drive that I have and use for wide field astrophotography. Also, it could be used for both my hydrogen alpha Lunt ‘scope and my 4-inch APO refractor, replacing the Astro-Tech Voyager alt-az mount (which has a stripped azimuth gear and a totally unresponsive manufacturer, but that is another story for another time).

I was advised that the SmartStar A has a recommended 12 pound maximum payload. My 4-inch refractor is just under this. The larger iOptrons can carry more, but I decided to get the SmartStar A anyway, since this is to be a lightweight travel mount.

### Out of the Box

The mount arrived less than a week after ordering. The first thing that struck me was the shortness of the tripod. Yes, I had been warned in the online reviews. This tripod is inappropriate for viewing while standing, however, I am fine with a sitting-only mount. That is the only way newcomers get a comfortable and satisfying view.

The second thing that struck me is how tiny the mount is. It is a small cube, with pink accents. Yes, I know I will get ribbing for a pink telescope mount, but I went with the pink over the other colors because it is a more welcoming look to attract visitors in front of the national park visitor center.

The third thing that struck me is the total lack of an owner’s manual. There’s just a quick start guide that only hits the high points (and is fraught with misspellings and poor grammar). Luckily, I had already searched and downloaded the pdf manual from [ioptron.com](http://ioptron.com) (which also suffered from poor writing).



### Setting It Up

It just takes a minute to put it all together. After setting up the tripod, I saw what others had been complaining about. There is nothing from stopping the tripod legs from “splaying” outward as you tighten the eyepiece tray/spreader plate. What a poor design! So I immediately went to ACE hardware and bought \$14 worth of chain and rings. I have to thank David Rogers for sending me pictures of his modification. This really helped tighten up the legs and increase tripod stability.



The manual advises to do initial setup and “playing” with the mount inside during the daytime. This is good advice, given that this computerized mount is highly complex and not intuitive. But since I’ve got experience with a couple other computerized mounts, I was able to get up to speed on this one.

I mounted my 4-inch APO refractor using a Vixen-style dovetail plate and immediately saw that it was going to tax this little cube. The altitude tightening knob really needs to be cranked to secure the scope. This is another issue cited in online reviews. The clutch is insufficient and tends to slip.

### First Night Out

Unlike most times after buying a new piece of equipment, it was clear the night after arrival. (I am in Michigan, so a clear and comfortable January night is highly unusual.) I carried the scope and mount onto the deck, and plugged in the mount using the included AC adapter. The mount powered up quickly, and the internal GPS automatically acquired satellites within a minute, requiring no button pushing. In addition to lat/long, the GPS feeds the correct time to the mount. All I had to do was a “one star align.” The mount tracked Venus & Jupiter at 130X for over half an hour! I was very pleased. The sound of the tracking motors inside the cube seemed a bit loud, but comforting. On the other hand, the slewing motors are like a coffee grinder (but no different than what you hear from other mass-produced mounts).

### A Night of Through Testing

About a week later, I decided to do a really critical evaluation. I carried the scope and mount outside, set it in place on the patio and plugged it into an outlet using an extension cord (7:23 p.m.). The first step is to point the mount’s “South” arrow to the south. This is an imprecise exercise because the arrow is short and the mount lacks long lines for sighting. The second step in aligning is ensuring the iOptron is leveled, so I fiddled with the leg heights until the bubble level was centered. The manual suggests using an additional “torpedo” level, but this is difficult because there are no large flat surfaces on the iOptron, so you have to trust the bubble. A torpedo level on the top surface shows that the bubble is pretty accurate, but is the top surface exactly parallel to the azimuth axis? The last step of setting up is to aim the telescope as perfectly vertical as possible. The small torpedo level was used to level the mounting ring, which I hope is 90 degrees from the scope’s optical axis. “Southing” and leveling and “verticaling” took until 7:28 p.m.



I turned on the mount switch and watched the hand controller display until “GPS OK” appeared. Wow, it took only about a minute to acquire the satellites, where my car GPS often takes a couple minutes. I pressed “Two Star Alignment,” the best possible in alt-az mode. The first star it suggested was Aldebaran, so I pressed “enter” and it quickly slewed to the star. I was using a 30-mm eyepiece, yielding nearly a three degree field. Aldebaran appeared near the center of the field of view. Yay! I changed slewing speeds to something slower, and carefully centered Aldebaran in the center of the field and hit enter again. The display suggested the second star was Alpheratz, so I hit enter and it slewed to this star in



Andromeda, on the other side of the meridian. The computer offers you a list of bright stars, but does not factor in the first one, so you only see stars that are up and located a good distance away from the first one. This means you may select a second star that is right next to the first one, and then the computer tells you that it is too close for a good alignment. I was miffed to NOT see Alpheratz in the eyepiece. Even an eyepiece with a whopping 3 degree field! So I sighted along the refractor tube to slew slightly to the right. I was about three degrees off of the star. I then saw the star in the 'scope and centered it precisely, hitting enter. Two-star alignment was done at 7:32 p.m.

So now it was time to test the accuracy of the alignment and the computer pointing. The computer contains an impressive list of objects, including all Solar System, Messier, NGC, IC, major stars, SAO double stars, variables, etc. I selected M31 and slewed. The Andromeda galaxy was smack-dab in the middle! Yee-hah (7:35 p.m.)! Then it was on to Venus, located about half a degree from the center of the field, still very good (7:37 p.m.). Next, a very difficult object to find: the first quarter Moon. It was located about a degree above the center of the field of view, but still well within the three degree field (7:38 p.m.). Nearby Jupiter came next, also offset about a degree up (north, 7:39 p.m.). M45, the Pleiades, were positioned about a degree up from the center of the field of view, which was perfectly acceptable to me. The wide field view was great (7:42 p.m.).

“Why not try a star?”, I thought. So I selected “stars” and was presented with a numbered list. The numberings went up with the alphabetical list of hundreds of the brighter named stars. Of course, these numbers mean nothing. You have to repeatedly press the down arrow to go down the list to find the star you want. This is very tedious. Gloved hands do NOT make this easy. The numbers mean **nothing**, so why are they there? Later, I discovered that I could enter a high number (like 050) to jump down the list. But this is not intuitive or easy. Star 061 is Betelgeuse, so I slewed there. It appeared near the top right edge of the field of view, nearly 1.5 degrees from the center. Acceptable, but concerning (7:43 p.m.).



I decided to do a rapid fire tour of the bright clusters in Auriga: M36, M37 and M38. All appeared at the upper right edge of the field of view (ending at 7:49 p.m.). The double star Castor was also positioned in the eyepiece, albeit at the edge. This was a difficult test because Castor was rising low in the East, opposite Alpheratz, the second alignment star. I decided to “nudge” the scope in the vertical so that Castor appeared in the center. Then selecting M35, the mount placed it perfectly in the center. Then back to the Moon, which also appeared close to the center. Jupiter was perfectly centered at 7:55 p.m.

So my initial experience is that this tiny cube works quite well to position objects in a wide field eyepiece, after a careful initial alignment.

After this experience, I carefully manipulated the scope while “locked.” I could feel that the altitude was locked down and tight. However, there is about a 1 degree “play/slop/backlash” in the altitude gear. This is the source of the pointing inaccuracy that I observed. This is also the reason it was hard to keep objects centered when trying to change eyepieces or focus.



## Tracking Test

I put the 'scope on Jupiter at 130X and watched it carefully for half an hour. The drive kept it in the 0.6 degree field of view easily during that time, but I could see tiny drift down and to the right, which is undoubtedly due to my imprecisely "Southing," leveling and "verticaling" the scope at the beginning of the run so this was no surprise.

## Modifications to Eliminate the Altitude "Play"

Another owner, "Paul C.," advised me to carefully remove the mount's cover and take a look at the altitude gears. I saw that once the mount was locked in altitude, any pushing of the telescope caused the entire altitude gear housing (plastic) to twist and flex. This is undoubtedly the cause of the 1° vertical play. I cut a wood pencil to the proper length and pressed it between the plastic gear housing and the inside of the metal case. A pencil happened to be the perfect width to stop the flexure. Now the "play" was nearly gone, which should result in better pointing accuracy and easier focusing.

One other modification recommended by David Rogers was to replace the nylon altitude clutch washer with a larger one. I did that and the 'scope is much easier to lock tight.

## Re-Testing After Modifications

I placed my Lunt hydrogen alpha scope on the mount and took it out into the (rare) clear winter day. After "southing," leveling, and "verticaling", I powered up the mount and it acquired the GPS satellites in about a minute. I selected the Sun and the mount gave me a loud warning "beep!" with a stern warning on the hand controller. Once the Sun was selected, the mount slewed to the Sun, centering it **perfectly** in the 40X eyepiece. Conveniently, the mount automatically switches to the solar tracking rate when you slew to the Sun. The altitude/vertical "slop" was now completely gone. Changing eyepieces and focusing is a breeze, as the object stays in the field of view. Using a 12V battery supply worked just fine with the mount.

## Detailed Astrophotography Testing

The third purpose for this mount, other than solar viewing during the day and refractor viewing at night, is wide field astrophotography. The goal is to have a highly portable drive that is accurate enough to take 2 minute exposures with my Canon 20Da and a 200mm lens. I also plan to use wider angle lenses which require a **lot** less tracking accuracy. So one night I set up the mount in "equatorial" mode by simply tilting the mount and locking it in place. Polar alignment was not quick, but quite effective. You roughly point the mount to Polaris, point the camera toward Polaris, align on one bright star, align on another bright star in another part of the sky, then press "enter". The display tells you how far off the mount is from the true north celestial pole both in altitude and azimuth, albeit using confusing terms like "Altitude: 82 mins higher". Does that mean too high or that I need to go higher? Adjusting altitude is easy with just a few turns of the tilt screws. Azimuth changes are





tough, as you have to carefully pick up the tripod and rotate it either easterly or westerly by a tiny bit. This iterative operation became easier for me once I found out that my 200mm lens gives a 4° altitude x 6° azimuth view of Polaris. So after the third iteration, when the mount told me I was a degree too high and two degrees too west, I could look through the camera to monitor my adjustments. It might have been funny watching me crane my neck to peer through the viewfinder as I hunched over the tripod, attempting to carefully rotate it. I stopped the process once I was aligned within a degree of the pole. The polar alignment took about thirty minutes.



I took a variety of 30-second exposures with the camera, and the results were pretty good. Most shots had very good tracking, with pinpoint stars (see Betelgeuse, left). However, when the camera was pointed near the zenith (the Pleiades), there was a large tracking error in the R.A. I conclude that this is simply a counterbalance error and the drive was slipping. So I have ordered the optional iOptron counterweight which should fix the problem.

I have concluded that this mount can be used for good 200mm astrophotography, if the counterweight fixes the slippage, and perfect for anything of shorter focal length.

### Not a Mount for Beginners

This is a mount that is priced and marketed for beginners. However, it is a poor choice for beginners because it is such a complex and non-intuitive product. I have seen online evidence of folks making mistakes with the mount and getting frustrated. As a result, there are an unusually high number of newer “cubes” and “towers” for sale on Astromart.





Here are the key drawbacks that will stump beginners:

- There is no manual included. You have to search, download and print your own.
- The manual is poorly written.
- The hand controller display is jammed with numbers (and they even boast about it)
- You have to precisely balance the telescope, a process not described in manual.
- Alignment requires knowing the names and positions in the sky of obscure stars. This is a huge problem, for how many beginners know where to find Alpheratz?
- The tripod is unstable and susceptible to dangerous falls, unless you install stability like I did.
- The “play” in the altitude gears will prevent folks from finding objects, prevent easy eyepiece changes, and prevent easy focusing unless one takes the mount apart and makes the suggested modifications.
- The power cord wraps around the cube as it slews to new objects, eventually causing damage unless you monitor the situation.
- Updating the firmware is a thirty step process, with the very real chance of wiping out the mount’s brain

This mount is analogous to a first generation piece of software. New and powerful, but full of bugs and rough edges. The opposite of what Apple would do, however, I suspect an “iMount” would cost \$1,200.

### **My Overall Assessment**

This mount seems like it will meet my needs well. It is inexpensive, considering all the things it can do. It is small and extremely portable. It quickly finds and keeps objects within the field of view. It can accommodate my solar scope during the day and my 4-inch refractor at night. I can fix or accommodate its shortcomings.

## **Minutes, March 2012 ASLC General Meeting**

By John McCullough, Secretary, ASLC

The secretary was unable to make this meeting. These minutes were taken by Vice-President Tracy Stuart.

Prior to the meeting being called to order, the Show and Tell was held and Dave presented a holder for a point and shoot camera to be used on the telescope.

### **Call to Order:**

The president called the meeting to order at 7:30 p.m. 23 March 2012, Room 77, Dona Ana Community College, Las Cruces, New Mexico.

### President’s Comments:

There were 14 members present and no guests. Our new member, Sidney Webb, introduced himself.

### Secretary’s Report:

There were three (3) corrections/clarifications to last month's minutes: The budget process does not begin until July, the deficit was \$300 for the month not the year, and members have ninety days to respond on the vote for the Bylaws not thirty. Tracy moved the minutes be approved as corrected and Pat seconded. The motion passed.

### Treasurer’s Report:

The Treasurer's Report was given. Ann moved approval of the Treasurer's report and Fred seconded. The motion passed.



**Committee Reports:**

Apparel Committee:

Ann McPhee, Committee Chairman, reported that as of March 23, 2012, \$1,616.50 in apparel has been sold and we have \$580.62 in inventory on hand.

Loaner Telescope Program:

The Loaner Telescope Committee is still seeking a chair. Ron has taken the position temporarily until someone can be found. The Society is still trying to locate all of the equipment that it owns. If anyone has telescopes, eye pieces, etc., please let Ron know as soon as possible. Also if you know what might have happened to any of our scopes, he would like that information as well. It is hoped that all of this equipment can be located and the program could then loan it to members at a reasonable cost of \$5 or \$10 per month. Ron also mentioned that any equipment deemed surplus might be auctioned off to improve the bank balance.

Membership:

John McCullough, Committee Chairman, was not present and no report was presented.

Leasburg Dam State Park (LDSP) Observatory Committee:

Ron Kramer, Committee Chairman, reported that the state archeologist found nothing to prevent the building of the observatory. The next step will be approval of the plans. It is hoped they can break ground in May and we would see "First Light" by the end of the year.

Tombaugh Observatory:

It was reported that things were going well at the Tombaugh Observatory. They have had good crowds at the NMSU open house

Outreach Committee:

Chuck Sterling, Outreach Coordinator: There were two star parties during March and the estimated crowd at one was about a hundred people with six scopes. On Saturday, March 31, The Friends of the Organs will have a fund raiser at Aguirre Springs with music and food. We have been asked to do a star party and will set up five or six telescopes.

We could possible do something for the annular solar eclipse on May 20 and the transit of Venus on June 5.

Earth Day is April 22 and we will be setting up our booth and the solar telescopes. We will need help for this so e-mail Ron if you can help us. Also, we could extend it to a star party after sun down.

Publicity:

Raymond Madson, Committee Chairman. There was no report.

Society Website:

Steve Barkes, web master. There was no report.

There were no additional committee or officer reports.

**Old Business:**

SHARE Fair:

The SHARE Fair has been moved to sometime in April. We will need volunteers. Ron is still looking for the third Post Office box key.

There was no additional old business discussed.



**New Business:**

Fund Raising Chair:

A Fund Raising Chair is needed. If you would like to volunteer, please contact Ron. There is a possibility of a \$5,000 grant through Pat Hynes. We would need someone with grant writing experience if we want to apply. It might purchase some equipment for Leasburg.

Society By-Laws:

It was reported that the new Bylaws will be e-mailed to all members by the secretary with a ballot. It is hoped that we can begin the voting process in April since we have been trying to update our Bylaws since last year.

Swap Meet:

Ron suggested we might sponsor a swap meet if there is enough interest. He also reported on his presentation to the Silver City Astronomers.

There was no additional new business for discussion.

There being no further business, Dave moved the meeting be adjourned and Fred seconded. The motion passed. After the meeting, a question and answer session was held.

-Respectfully submitted by Tracy Stuart, Vice-President and acting Secretary

## 2012 May 20 Annular Solar Eclipse Circumstances

By Bert Stevens, HDO Editor

**Estancia (NM)**

Lat.: 34.7883° N      Long.: 106.0572° W  
Duration of Annularity: 4m25.9s      Magnitude: 0.966

Event	Time (UT)	Alt	Azi
Start of partial eclipse (C1):	00:28:53.6	+017.7°	282.7°
Start of annular eclipse (C2):	01:33:48.2	+005.0°	291.2°
Maximum eclipse:	01:36:01.2	+004.6°	291.5°
End of annular eclipse (C3):	01:38:14.1	+004.1°	291.8°
End of partial eclipse (C4):	02:36:20.7*	-006.6°	300.3°

**Tohatchi (NM)**

Lat.: 35.8334° N      Long.: 108.7602° W  
Duration of Annularity: 4m28.7s      Magnitude: 0.967

Event	Time (UT)	Alt	Azi
Start of partial eclipse (C1):	00:26:45.8	+020.5°	280.7°
Start of annular eclipse (C2):	01:33:09.7	+007.5°	289.6°
Maximum eclipse:	01:35:24.0	+007.1°	289.9°
End of annular eclipse (C3):	01:37:38.3	+006.7°	290.2°
End of partial eclipse (C4):	02:36:51.0*	-004.2°	298.8°

**Albuquerque (south)**

Lat.: 35.0209° N      Long.: 106.6498° W  
Duration of Annularity: 4m26.5s      Magnitude: 0.966

Event	Time (UT)	Alt	Azi
Start of partial eclipse (C1):	00:28:27.1	+018.3°	282.3°
Start of annular eclipse (C2):	01:33:40.9	+005.5°	290.9°
Maximum eclipse:	01:35:54.2	+005.1°	291.2°
End of annular eclipse (C3):	01:38:07.4	+004.7°	291.5°
End of partial eclipse (C4):	02:36:28.3*	-006.1°	300.0°

**Chinle (AZ)**

Lat.: 36.1521° N      Long.: 109.589° W  
Duration of Annularity: 4m29.6s      Magnitude: 0.967

Event	Time (UT)	Alt	Azi
Start of partial eclipse (C1):	00:26:02.7	+021.4°	280.0°
Start of annular eclipse (C2):	01:32:54.6	+008.3°	289.0°
Maximum eclipse:	01:35:09.5	+007.9°	289.3°
End of annular eclipse (C3):	01:37:24.2	+007.5°	289.7°
End of partial eclipse (C4):	02:36:57.7*	-003.5°	298.3°

**Albuquerque (west)**

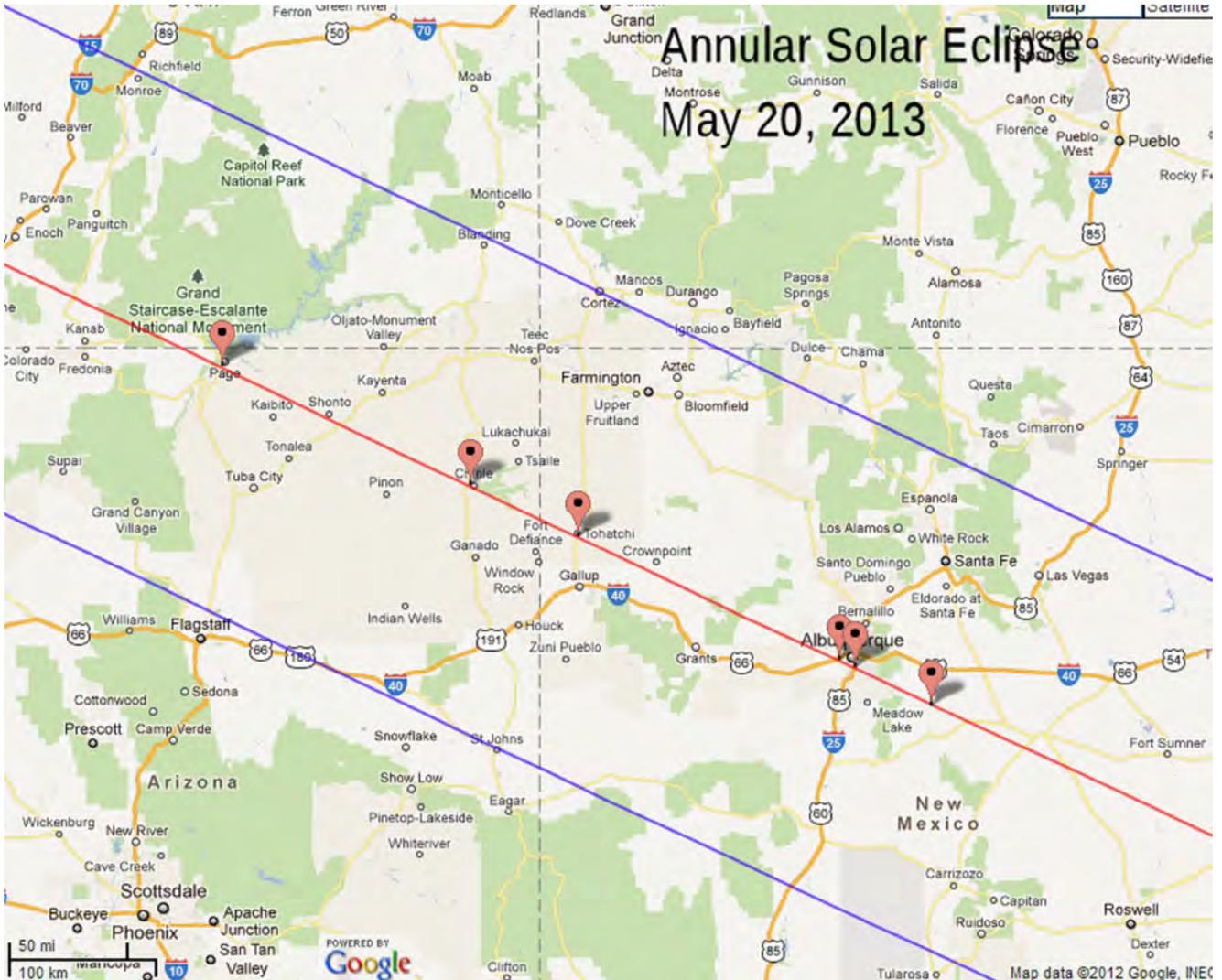
Lat.: 35.0667° N      Long.: 106.7691° W  
Duration of Annularity: 4m26.6s      Magnitude: 0.966

Event	Time (UT)	Alt	Azi
Start of partial eclipse (C1):	00:28:21.7	+018.4°	282.2°
Start of annular eclipse (C2):	01:33:39.4	+005.6°	290.8°
Maximum eclipse:	01:35:52.8	+005.2°	291.1°
End of annular eclipse (C3):	01:38:06.0	+004.8°	291.4°
End of partial eclipse (C4):	02:36:29.8*	-006.0°	299.9°

**Page (south of Lake Powell, AZ)**

Lat.: 36.884° N      Long.: 111.4923° W  
Duration of Annularity: 4m31.6s      Magnitude: 0.967

Event	Time (UT)	Alt	Azi
Start of partial eclipse (C1):	00:24:16.2	+023.3°	278.4°
Start of annular eclipse (C2):	01:32:14.1	+010.1°	287.8°
Maximum eclipse:	01:34:30.0	+009.7°	288.1°
End of annular eclipse (C3):	01:36:45.7	+009.3°	288.4°
End of partial eclipse (C4):	02:37:08.2*	-001.9°	297.2°



With the 2012 Annular Eclipse just a lunation away, here are some possible observing sites for seeing the Moon form a perfect annular ring. The further west you go, the higher in the sky the Sun will be in the sky, but the main issue is the weather. You can use these sites to find an acceptable location for observing on (or near) the centerline. You should try to locate within two mile of the centerline to keep the Moon from appearing off-center during the eclipse. As little as five miles from the centerline will make the Moon appear off-center.

During the eclipse, the Moon is farther from the Earth than average, so it will appear smaller than the Sun. When it tries to cover the Sun, the Moon will be unable to cover the Sun's whole disc, so it will appear as a bright ring of fire in the sky. The path of annularity, a 190 mile wide west-northwest to east-southeast swath, will allow you will see the annularity. The path starts in eastern China, crosses southern Japan, traverses the Pacific Ocean, and entering the United States in northern California. It continues across southern Nevada, the Utah-Arizona border and into north-central New Mexico, ending at sunset near Lubbock, Texas.

Locally, the center of the path goes through Tohatchi, NM (just north of Gallup), southern Albuquerque and midway between Clovis and Roswell. The Sun will be very low, only about five degrees above the western horizon, so you will need a good western horizon. The Ring of Fire will last about four and a half minutes.

If you view the eclipse, you will need a solar filter. It will be just like looking at the uneclipsed Sun, so be very careful not to look at it directly or you could damage your eyes. You can utilize this interactive map at <http://eclipse.gsfc.nasa.gov/SEgoogle/SEgoogle2001/SE2012May20Agoogle.html> .



**Calendar of Events April/May 2012 (MST)**

Apr. 27	7:30 p.m.	April ASLC General Meeting
29	3:57 a.m.	First Quarter Moon
30	2 a.m.	Venus greatest brightness this apparition
May 05	9:35 p.m.	Full Moon
12	3:47 p.m.	Last Quarter Moon
13	7 a.m.	Jupiter in conjunction with the Sun
15	11 a.m.	Venus stationary
20	5:47 p.m.	New Moon – Annular Solar Eclipse
22	Evening	Moon near Venus.
25	7:30 p.m.	May ASLC General Meeting

Be sure to visit our web site for the latest updates: <http://www.aslc-nm.org>

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**PO Box 921**  
**Las Cruces, NM 88004**



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 for Over 50 Years

