Astronomical Society of Las Cruces

The High Desert Observer

The Bulletin of the Astronomical Society of Las Cruces

Sharing the Universe with our Community for over 60 years

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March Meeting

Our next meeting will be on February 28, 2014, at the DACC Main Campus, Room 141, Technical Studies Building, starting at 7:00 pm.

Our guest speaker will be our very own Steve Barkes. He will be talking about the ASLC 11th Annual Messier Marathon

Outreach

Outreach is a very important part of ASLC. We are always looking for more volunteers to help us educate the public. Even if you do not have a portable telescope to bring to the events, please consider attending our public outreach programs to help answer questions, share knowledge and point out constellations in the sky.

Events

ASLC hosts deep-sky viewing and imaging at our dark sky location in Upham. We also have public in-town observing sessions at both the International Delights Cafe (1245 El Paseo) and at Tombaugh Observatory (on the NMSU Campus). All sessions begin at dusk.

At our Leasburg Dam State Park Observatory, we hold monthly star parties. Located just 20 miles north of Las Cruces, our 16" Meade telescope is used to observe under rather dark skies.

Please see *Calendar of Events* for specific dates and times.

Annual Dues

Please note that annual dues were due in January. Please contact our Treasurer, Patricia Conley (treasurer@aslc-nm.org) for further information. Dues can be paid at the next meeting or via mail, sent to Treasurer ASLC, PO Box 921, Las Cruces, NM 88004.

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 Society and public educational projects. Members receive the *High Desert Observer*, our monthly newsletter, plus membership to the Astronomical League, which includes their quarterly publication, *Reflector*.

Individual Dues are $30.00 per year

Family Dues are $36.00 per year

Student (full-time) Dues are $24.00

Dues include electronic delivery of the *HDO*. Prorated dues are available for new members. Dues are 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 $5.00 (per year) Sky and Telescope *magazine discount.*

ASLC Board of Directors, 2014

Board@aslc-nm.org

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Outreach Events for February, 2014

by Jerry McMahan and Steve Shaffer

Saturday, February 15; Tombaugh Observatory Sky Safari
The full Moon was low enough in the sky that we would not be able to see it through the tree to the east. Twelve viewers had a nice look at Jupiter instead. Trish Conley, Jerry McMahan and Steve Shaffer were the ASLC members in attendance. Jerry is donating a 2" moon filter to the observatory. None of the eyepieces there are threaded but the diagonal is.

Thursday, February 20; Desert Hills Elementary School
This star party had a great turnout, both from students, their parents, the teachers and Club members.

Nils Allen brought his 15-inch Dobsonian, Chuck Sterling set up both his 10-inch and his 100mm refractor, while Sid Webb had his 10-inch GOTO Dobsonian (which was not going to), Steve Shaffer was using his small Dobsonian, while Ed Montes brought his small refractor, Tracy Stuart was using the 8-inch SC and I had the 125mm ECT with a one-half focal reducer. That was probably the longest sentence I have ever written. Leave it alone Ron! Before it got dark, Chuck pointed the refractor at the Sun, which showed a nice group of sunspots. I used the 125mm to look at the observatory on A-Mountain, and Ed was showing people the mountains with his refractor. People seemed to enjoy those views even before we got to the night time viewing. The evening views included Jupiter, the Pleiades, the open cluster M41 and the Orion Nebula. It was a successful evening even though bright lights from the school prevented us from pointing at any thing to the north.

Saturday, February 22; Leasburg Park
We had two events again. A daytime afternoon was for viewing the Sun. Steve H (I don't know his last name yet) brought a H-Alpha scope and Chuck Sterling provided a white light view with his 100mm refractor.

It did not look like we would have any luck with the clouds during the evening. When Chuck saw that Jupiter could barely be seen through the clouds, he decided to open the observatory anyway. The gamble paid off since the sky began to clear, the best view being high in the sky and later to the North. Jupiter provided another shadow transit by one of his moons and the 16-inch scope made the supernova in the galaxy M82 easy to see even though it has started to fade. It was near magnitude 11.5, a full magnitude fainter then the 10.5 peak (about 2.5 times fainter).

I assisted Chuck in the observatory while Sid Webb set up his 10-inch (still not gotoing) outside. Yes, I know I invented a new word, but my record long sentence got me started. He was joined by Rich Richins and his 16-inch Dobsonian. Daniel Giron was there for presentations for both sessions. Computer problems limited his success, but his time spent was still appreciated.

Juan Munoz brought in a group from Mexico. They seemed to have had a good time and were very interested in learning about what they were seeing. The session that started out looking like it was going to be a flop (clouds) turned out pretty good after all.

Recap of Outreach Activities for 2013
We finished 2013 with about 550 hours of outreach directly with the public. This did not include many hours that were put into setting up various outreach programs. Jerry Gaber, Ron Kramer and Chuck Sterling were instrumental in getting the Leasburg Observatory and telescope going. Chuck was also involved in setting up the various star parties in his role as Outreach Chairman. Daniel Giron made sure that activities were advertised. Steve Shaffer worked to improve the observatory and the tracking of the telescope at the Clyde Tombaugh Observatory. Rich Richins worked with schools as Education Chairman. Jerry Gaber also works with the school system. Trish Conley and John McCullough worked to get our participation at the Renaissance Faire going. I am sure that I left some people out, but the point is that a lot of time is spent getting outreach programs ready, even before they actually happen. In addition, Sid Webb worked to obtain a grant for equipment to use with the 16-inch scope.

Through February, 2014, we are ahead of last years pace. We have put in about 170 hours with the public at events so far.

Calendar of Events: March - April, 2014 (Mountain Time - 24 hr. clock)

MAR 16	11:08	Full Moon
18	14:38	Moon - Spica Conjunction
18	21:14	Moon - Mars Conjunction
20	10:57	Vernal (Spring) Equinox
20	21:40	Moon - Saturn Conjunction
21	19:00	ASLC MEETING; Room 141, DACC Main Campus, Technical Studies Bldg.
22	18:00	OUTREACH; Leasburg Dam State Park Observatory
23	19:46	Last Quarter Moon
26	09:06	Moon - Spica Conjunction
29	Dusk	DSO Upham; Messier Marathon
30	12:45	New Moon
APR 04	00:54	Moon - Aldeberan Conjunction
04	21:00	OUTREACH; Tombaugh Observatory
05	Dusk	OUTREACH; MoonGaze, International Delights Café
05	20:30	OUTREACH; Sky Safari; Tombaugh Observatory
07	02:31	First Quarter Moon
08	14:11	Mars at Opposition
14	12:24	Moon - Mars Conjunction
14	21:56	Moon - Spica Conjunction
15	01:42	Full Moon
15	01:47	Total Lunar Eclipse
15	19:00	OUTREACH; Sierra Middle School
17	01:42	Moon - Saturn Conjunction
19	Dusk	OUTREACH; Leasburg Observatory
22	01:52	Last Quarter Moon
22	11:12	Lyrid Meteor Shower
24	19:00	OUTREACH; Oñate High School
25	17:16	Moon - Venus Conjunction
25	19:00	ASLC MEETING; Room 141, DACC Main Campus, Technical Studies Bldg.
26	Dusk	DSO Upham
29	00:14	New Moon

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

February 2014 Meeting Minutes by John McCullough

Show & Tell

Rich Richins initiated this month's Show & Tell segment by describing a 10" Newtonian on a Dobson mount that was donated to the Society by Ms. Becca Krebs at a recent Moon Gaze. He says the telescope is in good shape, although somewhat dirty. The mount was irreparable but he has plywood panels cut that he plans to assemble into a replacement mount this weekend. This telescope does not have go-to capability currently installed, but that is a possibility if a member is interested in assembling and installing that application. Ron Kramer noted that he has received an 8" DynaMax, a 70's era telescope and mount, from a couple residing in Picacho Hills, that was only used twice. Both telescopes will probably be added to the Loaner Telescope program when functional. Dave Anderson took over the Show & Tell at this point. He noted that he has been leading the Show & Tell for a while and would like someone to step in for future sessions. Dave then recognized John Kutney. John is attempting to image the Einstein Cross, a gravitationally lensed quasar in Pegasus, but is having issues. This led him to the technique of plate solving. He ended up using *AstroTortilla* software, partly because it's free and he's thrifty (John says). John suggested members visit *Light Vortex Astronomy* for a worthwhile overview and

tutorial on the technique. Fred Pilcher uses a different software package ($150) that works a little differently to accomplish the same end.

Robert Kimball asked about CCD imaging and the need for and use of bias and dark frames. Discussion followed.

Call to Order
Rich Richins, President, Astronomical Society of Las Cruces (ASLC, the Society), called the February business meeting to order at 7:37 pm, 28 February 2014, Room 141, Doña Ana Community College (DACC), Las Cruces, New Mexico.

President's Comments
The President, Rich Richins, welcomed the group to tonight's meeting. Rich noted that the Society has had a long history (long enough to be outside his and the DACC staff's memories) of holding monthly meetings in Room 77 of the DACC. However, the DACC has asked the Society to relocate its meetings for a number of reasons including refurbishment and upgrade of the old area. The new location, Room 141, has several tables, audio/visual capability, projection screens and a projector, if needed. Room 141 is located in the Industrial Trades wing of the campus and is available later in the evening (10:00 pm), giving the Society additional flexibility on meeting length. Rich welcomed new member Paul Ribaudo and guest Wendy Churchill. Paul retired in October and relocated to Las Cruces from Long Island, NY. Wendy is a local dentist and the wife of tonight's speaker.

Secretary's Report
The Secretary, John McCullough, reported that the minutes for the January 2014 meeting were submitted for publication in the February issue of the Society newsletter, the *High Desert Observer* (HDO). Robert Williams moved that the minutes be accepted as published, Chuck Sterling seconded and the motion passed by acclamation. There was not an additional Secretary's report.

Treasurer's Report
The Treasurer, Trish Conley, reported on the status and balances of the Society's accounts, including receipt of the final installment of the NM Space Consortium grant for the Observatory at Leasburg Dam State Park (LDSP). The Society's Certificate of Deposit matured earlier this year and was re-invested. There was no additional Treasurer's report.

Committee Reports

Observatory at LDSP
Jerry Gaber, Co-chairman, deferred to Rich Richins for an update on activities at LDSP. Rich had spoken with the Park Manager, "Skeeter" Giron, about installing a small parking area closer to the Observatory building to facilitate movement of telescopes and observing equipment. "Skeeter" offered to level and improve the path to the Observatory but parking for loading/unloading nearer the building will not be allowed. Rich offered that the Society should consider obtaining an inexpensive "nursery" cart with pneumatic tires to help transport equipment. However, storage of such a cart at the Observatory could be another issue. Electrical/electronic issues with the building, including exterior lighting and VGA capability, are being addressed. Rich also asked about installing a few concrete pads for additional member telescope placement near the building. "Skeeter" offered to provide four 4' x 4' pads for members' use.

Two public observing nights at the Observatory are being considered in May: 10 May is Astronomy Day and 24 May is the 3rd quarter Moon and "Music under the Stars". As Texas Star Party (TSP) begins 25 May, additional volunteers and telescope operators will be needed for the 24 May event.

Apparel
Ron Kramer, acting Chairman, had shirts available for purchase after tonight's meeting. He needs a final color determination for the new golf shirts he is preparing to order. An email survey will be distributed to members via the yahoo group. Also, a full-time/permanent chair for this activity is needed.

Membership
John McCullough, Committee Chairman, asked that members and visitors please register on the sign in sheets. John also noted that a number of new member/current membership care-related tasks are not getting done. Judy Kile has expressed an interest in performing those tasks and John is willing to step aside in her favor. As Judy was not present at tonight's meeting, this move is still being discussed.

Loaner Telescopes Program
Ron Kramer, Program Coordinator, reported there will be six (6) telescopes active in the program once all the equipment is in working order. These include the recently donated telescopes. The fee is $10/month or repair one of the non-working telescopes in exchange for two months use. This is a good way to get exposure to different type, size, and capability telescopes before purchasing one.

Outreach
Chuck Sterling, Outreach Coordinator, announced two (2) school star parties in March: 06 March at Central Elementary and 11 March at Desert Springs Christian Academy on Missouri. He has sign up sheets available for both events. The current revision of the 2014 Events Calendar is available on line; Chuck also has five (5) hard copies with him tonight.

ALCon 2015
Ron Kramer, Convention Coordinator, reminded the membership that the Astronomical League (AL) 2015 annual convention will be held in Las Cruces, hosted by the Society. The Association of Lunar and Planetary Observers (ALPO), International Dark Sky Association (IDA), and American Association of Variable Star Observers (AAVSO) are also considering holding conventions in Las Cruces at the same time. Numerous volunteers will be needed to plan and conduct ALCon 2015 and Ron will send an email to the membership requesting volunteer commitments. He plans on holding the first coordination meeting in March. He is also working with the Las Cruces Convention and Visitors Bureau on options and details.

There were no additional officer or committee reports.

Old Business
There was no old business for discussion.

New Business
March Monthly meeting – Rich Richins announced that next month's meeting is scheduled for 28 March. This occurs during NMSU's/DACC's Spring Break and DACC has informed him that the building will not be accessible to the Society on that date. Rich presented three options:

1. Move the March meeting date to the 3rd Friday, 21 March, in Room 141, DACC.
2. Move the meeting location to the Good Samaritan Village Creative Arts room on the 4th Friday, 28 March.
3. Move the meeting location to the Observatory/meeting room at LDSP on the 4th Friday, 28 March, followed by the Messier Marathon.

The options were voted on by the members present and the most support was expressed for Option 1. Therefore, the March 2014 Monthly Meeting of the Astronomical Society of Las Cruces will be held on 21 March 2014 at 7:30 pm in Room 141, Doña Ana Community College (DACC). As a result of this decision, submissions to the HDO must be made no later than 05 March for inclusion in the March issue.

There was no additional new business for discussion.

Announcements/Awards
Rich Richins announced that John Kutney, AL Master Observer, has been awarded AL's Galaxy Groups and Clusters Award. This award required 18 months of effort and sketches of 120 of the 250 potential targets on John's part. John discussed his observing methods and displayed his resource material for this project. His is the 35th of the award to be made.

There were no additional announcements/awards made.

Ron Kramer moved to adjourn the business portion of tonight's meeting, Bert Stevens seconded. The business meeting concluded at 8:07 pm.

Presentation

This month's presentation was by New Mexico State University (NMSU) Astronomy Department Associate Professor Dr. Chris Churchill. His topic was *Our Quest to Understand Galaxies*. Dr. Churchill began by discussing our developing understanding of galaxies over the last 80 years and what our most modern ideas are up to the present day. It turns out that the flow of gas into, through, and out of galaxies is where all the action is - that what really governs how a galaxy system evolves is the gas (it's all about the gas!) that is dynamically being processed through a large, massive, gaseous region surrounding the galaxy that is called "the circumgalactic medium". The observational and theoretical efforts (including cosmological simulations) currently being leveraged to solve the open questions were reviewed, with an eye on the research occurring at NMSU. Dr. Churchill closed with a simulation of the collision and subsequent interaction of our Milky Way galaxy with the Andromeda (M31) galaxy

Rich Richins reminded members that ASLC now has a Facebook page. He encourages everyone to visit and "like" it. The Albuquerque Astronomy Society (TAAS) has more than 1000 likes; he'd like to surpass that.

The February meeting of the Astronomical Society of Las Cruces concluded at 9:15 pm.

-Respectfully submitted by John McCullough, ASLC Secretary

Back at the Telescope by Berton Stevens

The word has gone out. A newly discovered asteroid is going to pass the Earth at a lunar distance away. The Minor Planet Center has provided a prediction that it will be close (in astronomical terms) to Earth. The news media gets wind of the encounter and it appears on the news. Whether it is 2014 DX110 or 2014 EC, it becomes a headline of the day.

But is it reasonable to report these objects to the public? Let us take a look at what we are really saying when we say an object is coming one lunar distance past the Earth.

Back in the late 1960s, we sent astronauts to the Moon. The voyage, launched with the massive Saturn V rocket, still took us three days to get to the Moon. They left the Earth traveling at 25,000 miles per hour (about 7 miles per second). They slowed down as Earth's gravity pulled them backwards and then sped up again as they were pulled forward by the Moon's gravity. Still, it took three days at high speed to reach the Moon. If you drove it at 80 miles per hour, it would take you 122 days of continuous driving to reach the Moon.

When an object passes the Earth, the nearest point is in a plane perpendicular to the motion of the asteroid as seen from the perspective of Earth. So if we think in terms of this plane, an object passing one lunar distance away from us is passing through an area about 89 billion square miles across. Earth's cross section in this expanse is only 25 million square miles, just 0.028% of that area. These close-passing asteroids are almost all very small, typically tens of yards across, so their cross section is negligible.

If the asteroid could cross the plane anywhere in the one-lunar-distance circle, then we can say that the probability of impact is the 0.028% of the area of the circle that the Earth occupies. But this is not the area where the asteroid may cross the plane. The actual area that the asteroid may cross is usually an ellipse, centered on the predicted penetration point in the plane. The size and shape of the ellipse depends on the asteroids motion, but more importantly on the observations that have been made before the encounter.

Every astrometric observation that is made has an error associated with it. Even the big observatories have errors that are around 0.1 seconds of arc. Amateur observatories, because of their smaller apertures, typically have errors in the range of 0.3 seconds of arc. In either case, really bright asteroids in a field with lots of reference stars results in better measurements. If there are not enough reference stars and/or the asteroid is

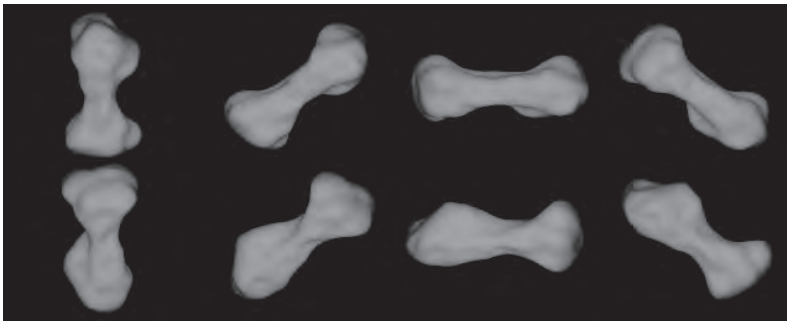
faint, the error will likely be larger.

These observations are reported to the Minor Planet Center without any error estimates. The orbit is computed, but each observation could be slightly wrong, making the actual orbit uncertain. Over the long run, the errors will average out and we will have a good orbit. A new discovery will have very few observations and we have no idea what the errors may exist.

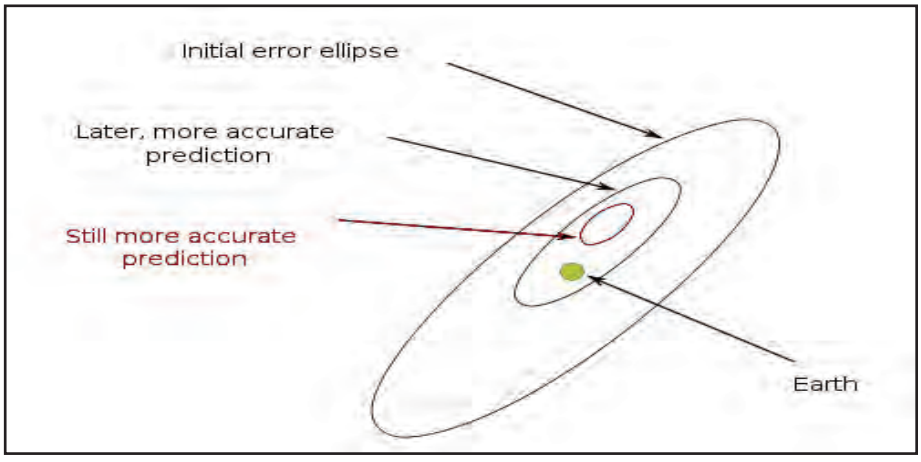
To determine the error ellipse, astronomers take each observation and assign an error to it. They then compute a set of orbits, varying the each observation between the limits of its error bar. The motion of the asteroid and the location where it penetrates the plane is then computed for each orbit. The penetration points can be fitted to an ellipse which shows all the possible locations where asteroid may cross the plane perpendicular to its motion. This is called a Monte Carlo technique.

With a small number of observations, the error ellipse may include the Earth. In this case, the probability of an impact is the ratio of the Earth's cross-section to the error ellipse's cross section. With a large error ellipse, this probability looks pretty small. As more observations come in, the error ellipse starts to shrink and as long as the Earth remains in the error ellipse, the impact probability will increase because the ratio of the Earth's cross-section to the error ellipse's cross section will continue get large as the ellipse's cross-section gets smaller.

So as additional observations are received, the impact probability continues to rise as the error ellipse shrinks as long as the Earth stays inside it. Eventually, the error ellipse gets small enough that the Earth is outside the error ellipse, and the impact probability immediately drops to zero. So for most discoveries, you will see the impact probability rise as the asteroid is observed until it suddenly drops to zero. So you should not get excited as a new discovery's impact probability continues to rise, because it will most likely suddenly drop to zero signaling that the asteroid will harmlessly pass the Earth.



This set of images is a reconstruction of Arecibo Observatory radar delay data of main belt asteroid (216) Kleopatra. It was the first main-belt asteroid to have a radar shape model published. Kleopatra orbits out between Mars and Jupiter and is about 133 miles long. It is thought that the dog-bone shape is anchored by two pieces of a protoasteroid that got hot enough to melt, allowing metals to accumulate its core covered by a more rocky material. It cooled and then was hit and shattered, with two pieces of the core becoming a contact binary that was then covered with metallic dust left over from the core giving its smooth, dog-bone, shape. It is essentially a flying rubble pile.



Minor planet (99942) Apophis is an NEO that comes very near the Earth. It may hit the Earth sometime after 2060. This diagram shows the shrinking of the error ellipse as more observations come in that improve the orbit. The area of the ellipse shrinks as the Earth's cross-section remains the same, causing the probability of impact to increase until the risk of impact goes to zero when the Earth falls outside the error ellipse.

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Image of the Month

This *Image of the Month* was taken by ASLC member Jeff Johnson on December 23, 2013, from his home in Las Cruces. Equipment included a Takahashi FS-60C @ f/6.2 telescope on a EM200 Temma II mount, QSI 540wsg @ -15°C with Astrodon Ha (3mm) and Tru-Balance I-Series LRGB Gen 2 filters and an SX Lodestar guider. Imaging details were 4x15m Ha, 2x5m ea RGB (all bin1x1), AstroArt5, CS4 (cropped, 10xdarks/flats/fdarks/bias).

This object shown is the “west coast” of the North American Nebula (in Cygnus) and the bright star is the orange supergiant Xi (χ) Cygni. The nebula is in the background.