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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.

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July Meeting

Our next meeting will be on Friday, July 25, 2014, at the DACC Main Campus, Room 141, Technical Studies Building, starting at 7:00 p.m.

Speaker for the June meeting will be Robin Hastings. Title of presentation: *Voyager: The Grand Tour* (abridged)

New & Existing Member Package

Membership Chair, Judy Kile has sent member packages to all current members before the June meeting. These were sent via Yahoo!Groups email. If you did not receive your package, please let her know (jkile@elp.rr.com) and she will send you a regular email with the package.

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 are due in January. 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.

ASLC Board of Directors, 2014

Board@aslc-nm.org

President: Rich Richins; President@aslc-nm.org

Vice President: Steve Shaffer; VP@aslc-nm.org

Treasurer: Patricia Conley; Treasurer@aslc-nm.org

Secretary: John McCullough; Secretary@aslc-nm.org

Director-at-Large: Tracy Stuart; Director1@aslc-nm.org

Director-at-Large: Jerry Gaber; Director2@aslc-nm.org

Immediate Past President: csterlin@zianet.com

Director Emeritus: Walter Haas

Committee Chairs

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Apparel: Ron Kramer; ronjkramer@aol.com

Calendar: Chuck Sterling; csterlin@zianet.com

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Grants: Sidney Webb; sidwebb@gmail.com

Librarian: *****OPEN*****

Loaner Telescope: Ron Kramer; ronjkramer@aol.com

Membership: Judy Kile; jkile@elp.rr.com

Night Sky Network: *****OPEN*****

Observatory:

Leasburg Dam: Rich Richins; President@aslc-nm.org

Jerry Gaber; jerrygaber@gmail.com

Tombaugh: Steve Shaffer, VP@aslc-nm.org

Outreach: Chuck Sterling; csterlin@zianet.com

Web-Site: Steve Barkes; steve.barkes@gmail.com

HDO Editor: Ron Kramer; ronjkramer@aol.com

President's Column

A Night at Kitt Peak:

We have a very special opportunity thanks to our good friend, George Hatfield. Society members will have an opportunity to tour and spend a night at Kitt Peak. The date that George has been able to arrange for us is Saturday, October 18. We would meet, and tour the mountain's telescope facilities with George as our official tour guide. We'd next participate in an Advanced Nightly Observing Program (ANOP) using the visitor's center's 16" and/or 20" RC scope(s). Dinner is included with the ANOP.



Following the ANOP, we will be free to stay on the mountain and observe and/or image using our own equipment. Moonrise is at 2:30 AM on 10/19, so we'd get several hours of observing/imaging. Lodging is available following the night's activities. There are a couple of double beds in the room which is normally available only to staff. There is also ample room for sleeping bags and air mattresses. Finally, we can begin the next morning with breakfast at the cafeteria.

There are modest fees for some of the activities. The ANOP costs \$60. Lodging will cost something, but not a lot (I do not have the exact amount). And there will be a fee for breakfast (again, not much). We will talk more about this trip this month and next at our regular ASLC meeting.

Around a dozen individuals expressed interest in this activity, and it sounds like we're going to have an opportunity not given to most visitors. So plan on being at the July and August meetings so that we can register you if you're interested in attending. Finally, a very, very special THANK YOU to George Hatfield for arranging this tour. I think it will be memorable, and hope to see many of you there.

In addition, our speaker for the July 25 meeting will be Robin Hastings, who was a part of the Voyager 1 and 2 missions, launched in the late 1970's. He will present pictures, accomplishments and anecdotes from those heady times. The Voyager missions were some of the most ambitious explorations ever undertaken.

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Recent Outreach Events

by Jerry McMahan

Saturday, June 21; Leasburg Dam State Park Observatory

This was a Solstice event, as well as Music & the Stars. It was also a cloudy event. Dave Doctor operated the 16-inch in the observatory. Assisting were Daniel Giron, Judy Kile and Ron Kramer. Sid Webb brought his 10-inch Dobsonian and was able to get Jupiter low on the Western horizon. I bought the 8-inch Celestron SC on the Meade LX80 mount. I did get Saturn, briefly early, and Mizar and Alcor late.

The clouds began to clear, at least along the ecliptic, around dusk. I made the joke that it would cloud over again when I finished setting up the scope. Really, it was just a joke. Just because I said it, doesn't mean I caused it to cloud over just as I finished, which it did. It wasn't my fault! I did not say that that it would clear up as soon as I took

the scope down. Just because that happened did not mean I caused it. I didn't say it! It wasn't my fault! Was it?

Saturday, July 5; Moongaze at International Delights Café

Several records were set at this Moongaze. First, we had seven club members present. Second, we had a total of four people look through the scope, for about two minutes on the Moon and Saturn. Yes, we had more members than customers since it was cloudy. We even had a few raindrops. There were more club members than raindrops.

Tracy Stuart brought his 8-inch SC. Jerry McMahan (me), brought the ETX-125. Also present were Ed Montes, Trish Conley, Daniel Giron, John McCullough and Steve Shaffer. Steve had opened up our dome at the Tombaugh Observatory for Sky Safari and joined us when he finished there.

Despite the clouds, it was a very pleasant night and we had a lot of time for conversation, making it a very enjoyable experience. There was some discussion about whether we had a quorum. We did not, which was lucky for me. They probably would have voted me off the island.

When I got home I unloaded the car. On my second trip outside, I saw the largest tarantula that I have ever seen. It was crawling up the out side of the screen door. I went out a different door. Don't laugh at me! You would have gone out a different door too! If you hear about any missing cattle, or horses in my area, this guy ate them!

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Calendar of Events (Mountain Time - 24 hr. clock)

JUL	16	12:21	Mercury - Venus Conjunction
	18	20:08	Last Quarter Moon
	19	18:08	OUTREACH: Music & the Stars at Leasburg Dam State Park Observatory; Entertainment by Los Gusanos
	22	05:56	Moon - Aldeberan Conjunction
	24	12:16	Moon - Venus Conjunction
	25	19:00	ASLC MEETING; Room 141, DACC Main Campus, Technical Studies Bldg.
	26	16:42	New Moon
	26	Dusk	DSO at Upham
	28		Delta-Aquarids Meteor Shower
AUG	02	07:27	Moon - Spica Conjunction
	02	Dusk	OUTREACH: MoonGaze at International Delights Café
	03	18:50	First Quarter Moon
	06	16:31	Venus - Pollux Conjunction
	10	12:09	Full Moon
	12	18:08	Perseids Meteor Shower
	16	13:00	OUTREACH: Mega-Music & The Stars at Leasburg Dam State Park Observatory; Entertainment by 4 groups; Double Clutchers Eli James, The Collaborators and Travis Manning, from 13:00 until 20:00; starparty at 21:00; public \$10.00 admission (plus usual parking fee), astronomers are free.
	17	06:26	Last Quarter Moon
	18	11:46	Moon - Aldeberan Conjunction
	22	19:00	ASLC Meeting; Room 141, DACC Main Campus, Technical Studies Bldg.
	23	Dusk	DSO at Upham
	25	08:13	New Moon
	26	21:10	Mars - Saturn Conjunction
	29	07:08	Neptune at Opposition
	29	13:08	Moon - Spica Conjunction
	30	Dusk	OUTREACH: MoonGaze at International Delights Café

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

June Meeting Minutes

by John McCullough

Show & Tell

A pre-business meeting Show & Tell session was not held.

Call to Order

Rich Richins, President, Astronomical Society of Las Cruces (ASLC, the Society), called the June business meeting to order at 7:32 pm, 27 June 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 welcomed the members and recognized guest Gary Starkweather, who lives north of Deming at the New Mexico Astronomy Village. Gary recently moved from Ft. Pierce, FL, where he was a member of the Treasure Coast Astronomical Society. Some members asked for more information about the Astronomy Village and Gary suggested they check *tomclarkbooks.com* for additional information.

Secretary's Report

Rich Richins reported the minutes for the May meeting had been submitted by the Secretary, John McCullough, for publication in the June issue of the Society newsletter, the *High Desert Observer* (HDO). If there were no corrections or discussion, Rich asked that the minutes be accepted as submitted. Ron Kramer moved that the minutes be accepted as published, Bob Kimball seconded and the motion passed by acclamation. There was not an additional Secretary's report.

Treasurer's Report

The Treasurer, Trish Conley, reported on some of the recent expenditures for the Society, including paying the liability insurance premium and paying for an eyepiece for the 16" Meade at LDSP. She also provided a status of the Society's various accounts.

Rich Richins reported that he had purchased a wagon to transport equipment at LDSP, paid for presentation speaker meals, and materials to repair a donated 10" Dobsonian telescope. All costs were reimbursed by the Society.

Ron Kramer reported he had recently had a meeting with the President of the Astronomical League regarding ALCon 2015. He stated that the Society should receive approximately 50% of the net profit from the ALCon, usually around \$3000. Ron will also be taking the Society ALCon volunteers to dinner sometime this summer.

Rich solicited suggestions to enhance the ASLC Observatory at LDSP experience. Sid Webb noted there are many additional features of the park overall and suggested members use the park, not just the Observatory, more and consider joining the Friends of LDSP organization.

Janet Stevens noted several hundred dollars have been donated to the Society in memory of several past members, particularly Scotty Murrel, which could be used for memorial plaques that could then be placed at the LDSP Observatory. Rich reminded those present that the ASLC Observatory at LDSP actually belongs to the State of New Mexico, not the Society. However, he is working with the Park Manager, "Skeeter" Giron, to do some things with the interior of the observatory. This may include images by members made from the Observatory and eventually plaques in honor/memory of Society founders and others.

Committee Reports

Apparel

Ron Kramer, acting Chairman, modeled the new dark green Society golf shirts that are available in various sizes. Ron also has other staple items with the Society logo.

Loaner Telescopes Program

Steve Shaffer did not have an update regarding a storage location for Society-owned items including the telescopes in the Loaner Program. There was additional discussion of alternatives that would not entail a membership dues increase. Ron Kramer offered a portion of a 10' x 20' storage unit he rents if the Society shares the rental cost. Tony Levatino offered the use of a steel building on property he owns north of Las Cruces.

Membership

Judy Kile, Committee Chairman, introduced new member Charles Turner, a neighbor of guest Gary Starkweather

at the New Mexico Astronomy Village. He has previously belonged to two other astronomy clubs but quit because of personality conflicts within the organizations. He enjoys the presentations at the Society's meetings. Judy also introduced Maurice "Moe" Azzolini who recently joined after taking an astronomy class through the DACC. He is looking forward to learning more about astronomy.

New Business

1. Donation - Steve Shaffer presented a tripod with an Orion binocular mount that was donated to the Society by the same lady that recently donated a 10" Dobsonian to the Society. The tripod may be offered to members for sale.

2. ALCon 2015 - Bert Stevens reported on progress toward organizing next year's event including the proposed schedule. Events are planned to begin on 06 July with a number of tours available for attendees. Society members are coordinating with Public Information contacts at various venues for "behind the scenes" tours. The convention officially begins on 09 July (Thursday) with registration. There will be multiple speaker sessions and vendors throughout the convention period. A Star-B-Que will be held at Leasburg Dam State Park on Friday evening followed by a star party. The Awards Banquet will be held Saturday evening with a prominent key note speaker still to be confirmed. The Hotel Encanto will be the convention venue and flagship hotel. Volunteers are getting a website ready for launch and ads for the Reflector starting with the next issue. Bert thinks both the Organ Mountains National Monument and the Tombaugh Observatory could be prominently featured. Society members should contact Ron Kramer or Bert to volunteer.

3. Kitt Peak Excursion - Rich Richins has been in contact with former member George Hatfield. George volunteers at the Kitt Peak Observatory in Arizona and may be able to organize an outing for the Society. Rich asked for a show of hands of members that would be interested in such an outing. Twelve members indicated interest.

Rich Richins entertained a motion to adjourn. Ed Montes moved to adjourn the business portion of tonight's meeting, Ron Kramer seconded. The business meeting concluded at 8:06 pm.

Presentation

This month's presentation was by members Rich Richins, Jerry Gaber, and Bob Kimball. Their topic was "Texas Star Party (TSP) 2014". Rich presented many images from this year's star party starting with the daytime activities that included golf in Alpine and Marfa, touring the area, and scuba diving at Balmorhea State Park. After full days of activities, nights were filled with imaging and observing. Highlights included Sí Señor Chicken night, the Last Man Standing Challenge, astronomy vendors and speakers. Jerry even won a nice set of 16 x 70 binoculars. Next up: Okie Tex!

The June meeting of the Astronomical Society of Las Cruces concluded at 9:01 pm.

-Respectfully submitted by John McCullough, ASLC Secretary

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Back at the Telescope

by Berton Stevens

Humans have been launching satellites into space for fifty-six years now. Even the very first ones included scientific instruments to measure the space environment. Instrumentation in Earthly laboratories is directly connected by wires to readouts so scientists can see the results of the measurement. The instruments and cameras in space cannot be connected by wires, so a method of sending the measurements back to Earth was invented, called telemetry (derived from the Greek roots *tele* meaning remote and *metron* meaning measure).

Most satellites carried multiple instruments so telemetry did not just mean sending one measurement, but many different measurements. This has required more and more complex systems to send telemetry back to Earth. Electrical power in any satellite is limited and so the transmitters were not very powerful. This required sensitive receivers here on Earth to receive the faint transmissions. In January 1958, the Jet Propulsion Laboratory (JPL), under contract with the Army, deployed radio tracking stations in Nigeria, Singapore and California. These tracked Explorer I, receiving its telemetry and helped measure its orbit's parameters.

Later that year, the National Aeronautics and Space Administration (NASA) was formed to combine the Army, Navy and Air Force space programs into a civil agency. JPL was transferred from the Army to NASA. NASA realized that it would be wasteful to have each program create their own tracking network, so they established the Deep Space Network (DSN). The DSN provided an infrastructure of large antennas, sensitive receivers, and powerful transmitters for tracking not only satellites orbiting the Earth, but also spacecraft going to the Moon, Mars, and beyond.

There are three Deep Space Network locations. Each one is a third of the way around the globe from the others. This allows a spacecraft to be in view of at least one site at all times. They are all located in natural bowls to help block radio interference that would keep them from hearing the faint signals from spacecraft.

The American site is located forty-five miles northeast of the desert city of Barstow, California, at Goldstone. Another is thirty-seven miles west of Madrid, Spain. The last is located twenty-five miles southwest of Canberra, Australia.

If you remember the Apollo 11 Moon landing, it was the Deep Space Station 46 (DSS46) antenna originally located at the Honeysuckle Creek Tracking Station in Australia that received the video of Neil Armstrong's first footsteps on the Moon. DSS46 is a 26-meter antenna that was in operation at Honeysuckle between 1967 and 1981. It was then moved to the Canberra site and continued to track spacecraft until 2009.

Each station has one seventy-meter wide parabolic dish for communicating with distant space craft. This is the "big gun" at each location. There are also three or four smaller dishes at each location, typically with thirty-four meter apertures. NASA is in the process of modernizing some of the sites, switching from a Cassegrain-type system to a waveguide type system.



The seventy-meter antenna located at the Goldstone Complex near Barstow, CA. This is one of the three highest sensitivity antennas for spacecraft tracking located around the world.



Deep Space Network site. The seventy-meter antenna is in the middle of this view. The Apollo antenna (DSS46) is not visible, but would be near the bottom in this view. It is visible on Google Earth.

But tracking spacecraft is not all these stations do. They also make astronomical observations in the radio spectrum. In addition, they can make radar observations of minor planets that come close enough to the Earth to be seen and create images of these objects. Finally, research into radio systems and testing is done at these locations.

You can see which spacecraft are being tracked at any time by going to DSN Now! at <http://eyes.nasa.gov/dsn/dsn.html>. This web page will give you a page showing all the active antennae at all three stations and the spacecraft they are communicating with. Each antenna will indicate what activity is in progress. If nothing is displayed, it is inactive. If there is a smooth sine wave going upward, it is transmitting a carrier to the indicated spacecraft. If the sine wave is jagged, it is actually transmitting data or commands. Conversely, if there is a downward traveling smooth sine wave, it is receiving a carrier from the spacecraft, while a jagged sine wave indicates that data is being receiving.

The Deep Space Network communicates with a wide variety of spacecraft. Some are at the Moon and planets in our Solar System. Others are orbiting the Earth-Sun LaGrangian points or independently orbiting the Sun. Voyager 1 and Voyager 2 are now moving outward beyond Pluto. Here is a list of most of the spacecraft currently communicating through the DSN:

- | | |
|---|--|
| Advanced Composition Explorer (Solar wind monitoring) | Mars Science Laboratory – Curiosity Rover |
| Cassini - Orbiting Saturn | Mars Express (European Space Agency) |
| Chandra X-ray Space Telescope | Mars Reconnaissance Orbiter |
| Cluster 1-2-3-4: Earth's Magnetosphere | New Horizons Pluto-Charon mission |
| DAWN Mission to Vesta and Ceres | Planet C - Akatsuki: Venus mission (Japan) |
| Geotail: Studying Earth's Magnetic Field | Rosetta: Comet sample mission |
| Juno: Jupiter Mission | SOHO - Solar & Heliospheric Observatory |
| Kepler Space Telescope | STEREO A & B: 3D Solar imagery |
| LADEE lunar mission | Spitzer Space Infrared Telescope Facility |
| Lunar Reconnaissance Orbiter | TDRS Tracking & Data Relay Satellite |
| Mars Odyssey | Themis (Artemis): Moon study |
| MAVEN: Mars Orbiter mission | Venus Express |
| Mars Rover: Opportunity | Voyager 1 |
| Mars Orbiter Mission (India) | Voyager 2 |
| MESSENGER: Orbiting Mercury | WIND: Solar Wind |

So here is an opportunity to see what spacecraft the DSN is communicating with at a given time. Once you load the page, it will automatically update every five seconds, so you really have a real time view of the current activity in the Deep Space Network.

The screenshot displays the NASA Deep Space Network Now! web page. The main content area is divided into three sections representing different DSN sites: Madrid (Spain), Goldstone (USA), and Canberra (Australia). Each site section shows a grid of satellite dishes with their respective antenna IDs and signal strength indicators. The Madrid site shows antenna DSS 54 is active, and the Canberra site shows antenna DSS 45 is active. A sidebar on the right provides details for the target spacecraft MAVEN, including its name, range, round-trip light time, and antenna name (DSS 54).

The Deep Space Network Now! web page. The motion of the transmission is not shown. You can see at the Madrid site, antenna DSS54 is communication with the Mavem spacecraft approaching Mars. Meanwhile, at Canberra, DSS45 is communicating with the Voyager 2 spacecraft.



The two Voyager spacecraft are sailing toward the edges of our Solar System. They are both still communicating with Earth and are expected to continue doing so for at least another ten years before they run out of power to operate the instrument packages.

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Image of the Month

