

# The High Desert Observer

## November

## 2015



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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, including their quarterly publication, *Reflector*, in digital or paper format.  
Individual Dues are \$30.00 per year  
Family Dues are \$36.00 per year  
Student (full-time) Dues are \$24.00

Annual dues are payable in January. 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. Contact our Treasurer, Patricia Conley (treasurer@aslc-nm.org) for further information.

*ASLC members receive electronic delivery of the HDO and are entitled to a \$5.00 (per year) Sky and Telescope magazine discount.*

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### November Meeting --

Our next meeting will be on **Friday, November 20**, at the DACC Main Campus, Room 141, Technical Studies Building, starting at 7:00 p.m. NOTE -This room is our OLD location.

The speaker will be Ranger Alex Mares, LDSP.  
Topic: Native American Astronomy.

### ASLC Board of Directors, 2015

[Board@aslc-nm.org](mailto:Board@aslc-nm.org)

President: Daniel Giron; [President@aslc-nm.org](mailto:President@aslc-nm.org)

Vice President: Steve Barkes; [VP@aslc-nm.org](mailto:VP@aslc-nm.org)

Treasurer: Patricia Conley; [Treasurer@aslc-nm.org](mailto:Treasurer@aslc-nm.org)

Secretary: John McCullough; [Secretary@aslc-nm.org](mailto:Secretary@aslc-nm.org)

Director-at-Large: Tracy Stuart; [Director1@aslc-nm.org](mailto:Director1@aslc-nm.org)

Director-at-Large: Ron J. Kramer; [Director2@aslc-nm.org](mailto:Director2@aslc-nm.org)

Immediate Past President: [rrichins73@comcast.net](mailto:rrichins73@comcast.net)

### Committee Chairs

ALCor: Patricia Conley; [tconley00@hotmail.com](mailto:tconley00@hotmail.com)

Apparel: Howard Brewington; [comet\\_brewington@msn.com](mailto:comet_brewington@msn.com)

Calendar: Chuck Sterling; [csterlin@zianet.com](mailto:csterlin@zianet.com)

Education: Rich Richins; [Education@aslc-nm.org](mailto:Education@aslc-nm.org)

Grants: Sidney Webb; [sidwebb@gmail.com](mailto:sidwebb@gmail.com)

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

Loaner Telescope: Frank Fiore; [ffchilehead@gmail.com](mailto:ffchilehead@gmail.com)

Membership: Judy Kile; [judykile3916@gmail.com](mailto:judykile3916@gmail.com)

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

Observatory:

Leasburg Dam: Rich Richins; [rrichins73@comcast.net](mailto:rrichins73@comcast.net)

Tombaugh: Steve Shaffer; [sshaffer@zianet.com](mailto:sshaffer@zianet.com)

Outreach: Chuck Sterling; [csterlin@zianet.com](mailto:csterlin@zianet.com)

Web-Site: Steve Barkes; [steve.barkes@gmail.com](mailto:steve.barkes@gmail.com)

HDO Editor: Charles Turner; [turnerc@stellanova.com](mailto:turnerc@stellanova.com)

### Member Info Changes

All members need to keep the Society informed of changes to their basic information, such as name, address, phone number, or email address. Please contact [Treasurer@aslc-nm.org](mailto:Treasurer@aslc-nm.org) and [jkile3916@gmail.com](mailto:jkile3916@gmail.com) with any updates.

### 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.

## ***From the Prez***

November 2015

### **Onwards!**

2015 could be considered a year of successful outreach for the ASLC. The most recent to date was the Ren-Faire at Young Park on November 7th and 8th. Members Trish Conley, Cristina Lugo, Janet Stevens, Judy Kile, Bert Stevens, John McCollough, Tracy Stuart, Ron Kramer, Ed Montes, Rich Richins, Chuck Sterling and Sid Webb did an outstanding job in representing our Society at this event. From their accounts the ASLC tent was heavily visited, with long lines at the telescopes and many people asking about the ASLC and its outreach opportunities. I am grateful for the work this group had done.



Throughout the year we had fun doing outreach at Leasburg Dam State Park, at the Moongaze in town and at various schools throughout the Las Cruces area. We even experimented in enhancing the public's outreach experience by having them take part in an astronomy quiz in order to earn a prize, of which some were educational in nature.

The ASLC also does outreach via the media in the monthly Sun-News column provided by member and Past-President Bert Stevens. Bert had also done radio interviews at a local station and he and Ron Kramer had done interviews on KRWG radio.

The ASLC will continue to do its outstanding job in outreach and, as we move onwards into 2016, we will also strive to do an outstanding job in "in-reach". By the November meeting, if not before, you will be presented with a list of possible activities in which you can participate either as a student, wanting to learn more about a particular facet of astronomy, or as an organizer and instructor wanting to give others the benefit of your knowledge and expertise. By working together, we can create a variety of "members-only" activities that will appeal to everyone. And when we do our outreach, we can let the public know about the benefits of the Society and entice new members.

It looks like 2016 will be a very interesting year and I'm looking forward to it.

Daniel Giron

\* \* \*

### ***Outreach Events***

by Jerry McMahan

#### ***Leasburg, Friday October 16, 2015***

This session was set up for a girls scout group. There were only about six scouts, along with their parents and scout leaders, but they were very enthusiastic about what they saw. The evening started cloudy, but cleared later to provide some good views, especially in the south from the observatory.

Dave Doctor ran the observatory. Chuck Sterling bought his 10 inch. I had the ETX 125. Christina Lugo and Daniel Giron gave away more prizes for taking quizzes.

**Moongaze, Saturday, October 17**

Again, it was cloudy at first, but did clear later so that we had about 30 minutes of observing at the beginning and another 30 minutes near the end.

I set up the ETX 125. Daniel Giron and Christina Lugo continued with quizzes and prize awarding. John McCulleum joined in to answer questions about the club.

**Tombaugh Observatory Open House, October 23**

I will leave the details to Steve Shaffer. The open house was the same night as the club meeting. A number of club members did come by after the meeting.

\* \* \*

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

03

NOV 01	00:00	Daylight Saving Time Ends
01	09:35	Jupiter - Double Shadow Transit
03	05:24	Last Quarter Moon
NOV 07 thru 08		Renaissance Faire, Young Park, Las Cruces - All Day
11	10:47	New Moon
14	17:00	Dark Sky Observing at Leesburg Dam State Park
17	18:00	OUTREACH; Columbia Elementary in Dona Ana 6 to 8 PM
17	20:00++	Leasburg Dam State Park viewing of Leonid meteor shower
18	23:28	First Quarter Moon
20	19:00	ASLC Monthly Meeting; DACC Main Campus, Room 141

**NOTE: Meeting location has been moved back to Room 141 main campus. Check**

**the club website for directions/maps.**

20	19:00	NMSU: Tombaugh Observatory Open House
21	17:00	OUTREACH; MoonGaze, International Delights Café
25	15:45	Full Moon
26	00:01	Thanksgiving: All Day
Dec 03	00:40	Last Quarter Moon
04	19:00	NMSU: Tombaugh Observatory Open House
05	17:00	Dark Sky Observing at Leesburg Dam State Park
11	03:30	New Moon
12	18:00	Holiday Dinner for ASLC - Time Approximate, Location TBD
18	08:14	First Quarter Moon
19	17:00	OUTREACH; MoonGaze, International Delights Café
21	21:48	Winter Solstice: Winter officially begins
25	00:01	Christmas: All Day
25	04:11	Full Moon

Be sure to visit our web site for the latest updates: [www.aslc-nm.org](http://www.aslc-nm.org)

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**Announcements**

**New (OLD) Meeting Room:** We have been told that our old meeting room, Room 141, will be available to us until next May 2016. We have decided to move back to this room because it is larger and the parking is more convenient.

\* \* \*

**Meeting Minutes**  
by John McCullough

***Minutes, October 2015 ASLC Meeting***

***Show & Tell:***

There were no presentations at tonight's meeting.

***Call to Order:***

Daniel Giron, President, Astronomical Society of Las Cruces (ASLC, the Society), called the October business meeting to order at 7:30 pm, 23 October 2015, Room 141, Doña Ana Community College (DACC), Las Cruces, New Mexico.

***President's Comments:***

The President, Daniel Giron, welcomed the group to tonight's Annual Meeting and requested that any outstanding ballots be turned in to the Elections committee. He asked that all attendees register their presence on the available sign in sheets and enter for the door prizes (books) to be presented at the end of the meeting. Daniel asked if all members had received the latest edition of the Society newsletter, the High Desert Observer (HDO), had read it and had any comments or corrections to the contents.

***Officer's Reports:***

***Secretary's Report:***

The Secretary, John McCullough, noted that an Outreach event at LDSP on 31 October (Halloween) reported in the September meeting minutes was a misstatement. Tracy Stuart moved the September minutes be accepted as amended, Bert Stevens seconded. The September minutes were accepted as amended by the members present. There was not an additional Secretary's report.

***Treasurer's Report:***

The Treasurer, Trish Conley, presented a report of the Society's account balances, including the money market account at US Bank. She noted the check to David Doctor for additional expenses for the observatory at LDSP had cleared and that a check for \$85 to the Doña Ana Arts Council (DAAC) had been issued for participation in the 2015 Renaissance Arts Faire. There was no additional Treasurer's report.

***Committee Reports:***

***Outreach:***

Chuck Sterling, program coordinator, reported that the Tombaugh Observatory was manned for an open house this evening, 23 October, and will be again on 20 November. The Renaissance Arts Faire will be 07 08 November with set-up on 06 November at Young Park. Please contact Trish Conley if you can support activities that weekend. There will be an event at Leasburg Dam State Park (LDSP) on 14 November. There will be a Moon Gaze at International Delights Café on 20 November. A Star Party at Columbia Elementary is tentatively scheduled for 17 November to start at 6:00 pm. Sid Webb reported there will be another event at LDSP on Winter Solstice, 05 December, with an opportunity to provide a public talk. As Park Ranger Alex Mares will be giving a presentation of the Native American perspective, Society member(s) could present the scientific perspective. Contact Sid if you are interested in making a presentation.



Howard Brewington will be making his “Last Generation of Visual Comet Hunters” presentation to The Albuquerque Astronomical Society (TAAS) tomorrow evening. Howard is also the Apparel Committee chair for ASLC.

Daniel noted the November presentation will be Alex Mares, Ranger at LDSP, on Navajo astronomy.

***Election Results:***

Ballots were tallied by the Elections Committee consisting of Tracy Stuart, Fred Pilcher, and Chuck Sterling. Officers for 2016 are as follows:

President: Daniel Giron  
Vice-President: Cristina Lugo  
Treasurer: Patricia (Trish) Conley  
Secretary: John McCullough  
Director #1: Ron Kramer  
Director #2: Sid Webb  
Rich Richins is the immediate Past President.

Trish Conley reported the Fall/Winter 2015-2016 issue of Las Cruces Magazine has an article from Spaceport America with photographs featuring member Emma Fuchs. Emma stated she won an essay contest at school and the prize was a trip to the Spaceport.

***Items for Sale:***

Trish Conley announced she has a MoonLite CS SCT focuser for sale. It was a door prize at ALCon 2015 and has a book value of \$370. Interested members should contact her.

***Recognitions/Awards:***

No recognitions or awards were announced.

The business portion of the meeting concluded at 7:53 pm.

***Presentation:***

This month’s presentation was by member Dr. David Doctor on “The Video Astronomy Universe - to LDSP and Beyond”. Dr. Doctor is also the co-chair for the Society for the observatory at LDSP. David noted that video astronomy is the newest, fastest growing area of visual astronomy. At LDSP, the video camera, a MallinCam Extreme, is mounted on a 110 mm refractor telescope and projects on a 40” LCD display. David went on to discuss some of the specifics of electronically assisted observing.

At the close of his presentation, Daniel presented a crystal mega structure of the universe to Dr. Doctor. He then conducted the drawing for door prizes. Carol Chiochio received a book; Kathy Doctor received a book on scientific astrophotography.

The next general meeting will be 20 November.

The October 2015 meeting of the Astronomical Society of Las Cruces concluded at 8:50 pm.

-Respectfully submitted by John McCullough, ASLC Secretary

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## ***Back at the Telescope***

by Bert Stevens

Many of us have telescopes, but virtually all of them are optical telescopes. Radio telescopes are like optical telescopes, but they cover the radio part of the spectrum instead of the visible part of the spectrum. They can observe the sky detecting a wide part of the radio spectrum, or focus in on just one frequency. All this magic occurs at the business end of the telescope, the detector, which in the case of a radio telescope, is an antenna.

In addition to the detector, the radio telescope has a focusing element. In reflecting optical telescopes, a parabolic mirror at the bottom of the tube reflects the starlight back up the tube and bringing it to a focus. Most radio telescopes have a parabolic dish that focuses the radio waves onto the detector. Since radio waves have a wavelength thousands of times longer than light waves, the focusing element of the radio telescope, often called the "dish" have to be correspondingly bigger to give astronomers the resolution they want.

In order to point the telescope at an astronomical object, the dish and detector are often placed on an alt-az mount. These alt-az mounted telescopes are called steerable radio telescopes. These gigantic structures can smoothly steer the telescope around the sky to point at whatever target the astronomer wants to observe. Astronomers want the largest dish possible for exactly the same reasons we want larger aperture telescopes. Larger telescopes, optical or radio, provide higher resolution and a stronger (brighter) signal.

Unfortunately, as the radio telescope's dish gets larger, the mounting has to get even larger. This effectively limits the size of the steerable radio telescope. Building a very large steerable radio telescope can be very expensive, since it takes a very complex design to support the dish and provide quick slewing and smooth tracking. The largest full steerable radio telescope is the 100-meter (333-foot) Robert C. Byrd Green Bank Telescope (GBT) at Green Bank, North Carolina. This telescope was completed in 2000, replacing the 90-meter (300-foot) Green Bank radio telescope that collapsed when a structural member failed. For comparison, the largest dishes in the Deep Space Network, used to communicate with spacecraft all over the Solar System, are only 70-meters (233-feet) across.

In the late 1950s, Professor William E. Gordon was studying the ionosphere and wanted to continue his investigations using radar backscatter. To conduct this research, a radio signal is sent upward and it bounces off the ionosphere. The returning signal is received by a parabolic dish. Gordon eventually managed to convince the Department of Defense to begin the construction of his telescope in the summer of 1960. Three years later, the Arecibo Ionospheric Observatory (AIO) was in operation under the direction of Professor Gordon.

The AIO was unique in that it only looks upward and is not steerable. It is built in a limestone sinkhole ten miles inland from the town of Arecibo, Puerto Rico. This location was chosen because it is close to the equator so it could observe the planets and other Solar System objects. It was built on Karst terrain, with its limestone sinkholes, that provided a natural support structure for the dish.

Since this is not a steerable dish, it could be much larger than other radio telescopes. It was built in a natural bowl-shaped sinkhole that provides the underpinning of the telescope's supports. The Arecibo dish has a spherical surface that is 305 meters (1,016 feet) across, giving almost ten times the signal



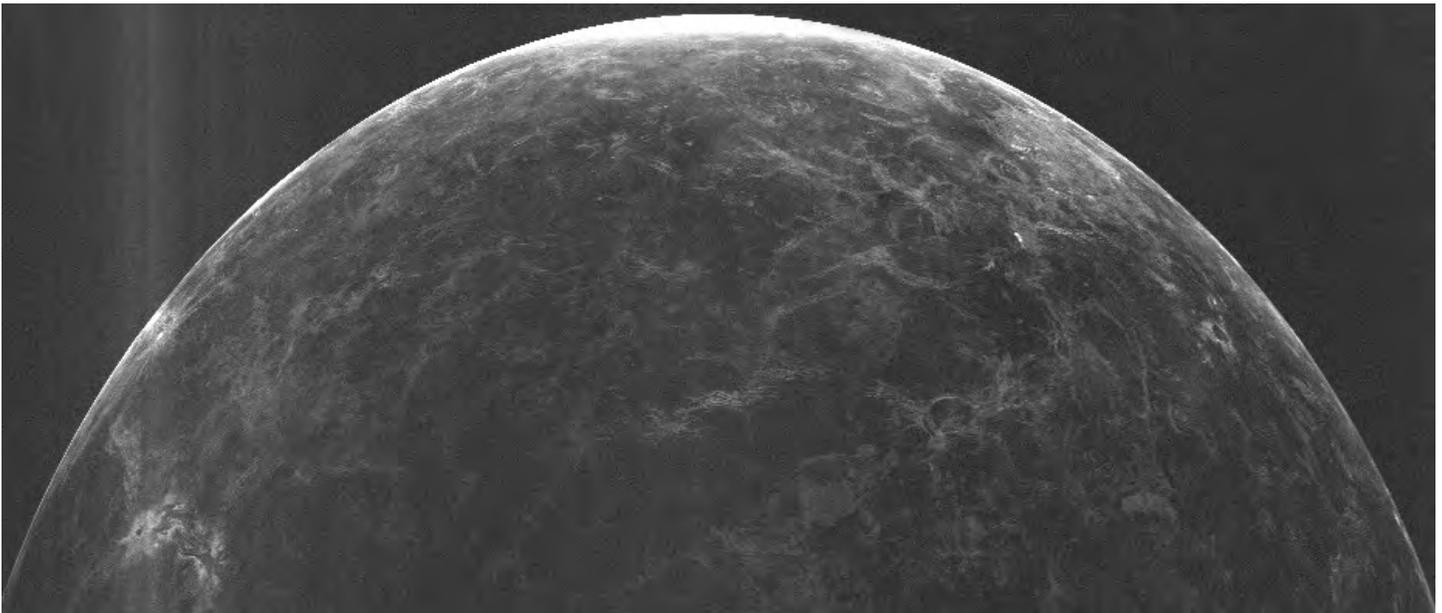
**Arecibo Observatory Aerial View**

This is an aerial view of the observatory in northwestern Puerto Rico. The antenna complex can be moved along its supporting cables to observe an object in a forty-degree band along the local zenith.

gathering area of the Green Bank telescope. In 1969, the National Science Foundation took over operation of the observatory from the DoD. The AIO became the National Astronomy and Ionosphere Center (NAIC) in September 1971.

By 1974, the reflective surface of the dish was replaced with a high precision surface that is still in use today. A high frequency planetary radar was also added to allow radar studies of the closer planets, moons, and minor planets. Twenty-three years later, a second upgrade was performed which added a higher power one megawatt transmitter and additional shielding was added to keep ground signals from contaminating the astronomical signal.

The latest upgrade has allowed the Arecibo telescope to make radar observations of many Solar System objects. They have detected water ice on the north pole of Mercury and studied changes on the surface of Venus. The Moon was also scanned for polar ice, but none was detected. Minor planets (asteroids) are a popular target, especially if they are coming near the Earth where astronomers can get much better resolution than minor planets that are in the asteroid belt. Comets also have been scanned to



### Radar Image of Venus

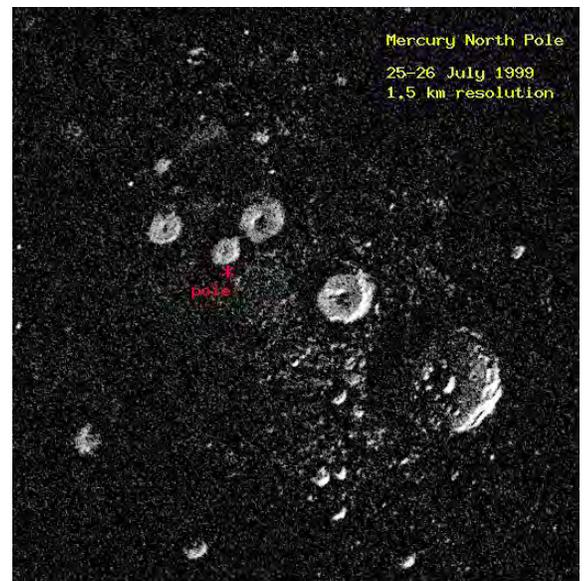
This is a section of the surface of Venus in a radar image mosaic taken by the Arecibo telescope. The surface of Venus is permanently hidden from view in the optical spectrum, so radar is the only way to study the surface. One of the goals of the project is to study changes to the floors and ejecta deposits of impact craters since the Magellan mission (1990-1994).

study the distribution of dust and gas in the comet. A special target is the hydroxyl (OH) molecule that absorbs solar radiation and can re-emit it as microwave radio energy that Arecibo can detect.

The new radar is powerful enough to study the moons of Jupiter and Saturn as well as Saturn's rings. The moons are studied to learn more about their surface and build maps of that surface hidden by the clouds. Radar cannot study the gas giants themselves because the radar signal does not reflect off the gas giant's clouds decks, but only off a solid surface like a moon.

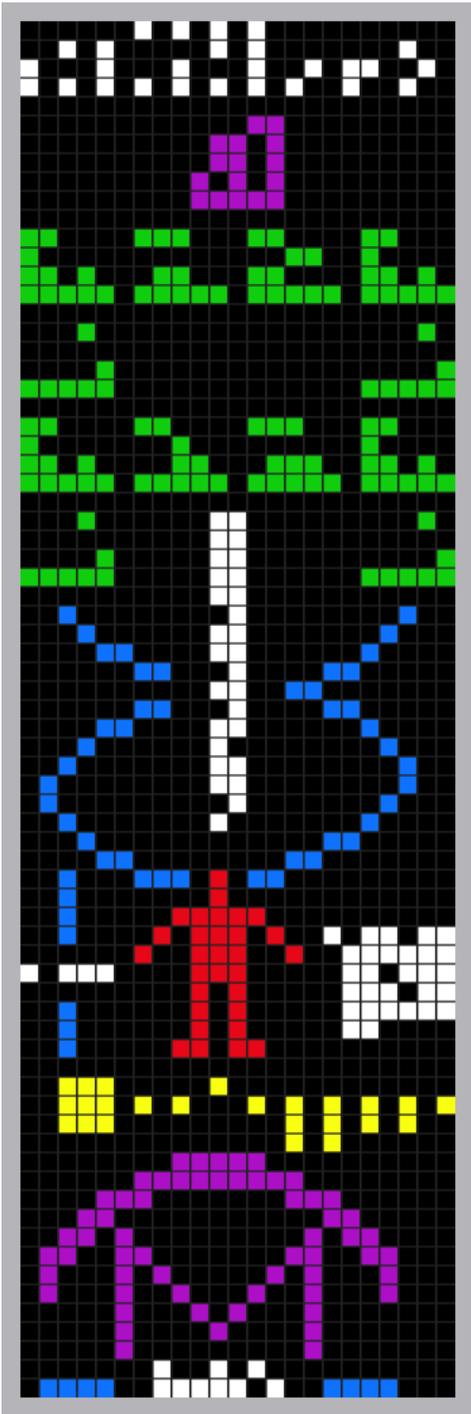
The Arecibo Observatory has even appeared in the movies. It was a backdrop in the James Bond film Golden Eye and 1995's The Survivor. Of course, none of us can forget Contact, where the big dish was a major player in the early part of the film. The middle of the film had the Very Large Array near Socorro replacing Arecibo as a backdrop.

While the dish is fixed to the ground and points straight up, the telescope can observe more than straight overhead. The antennas, suspended by eighteen cables from three towers around the periphery of the dish, can be moved. By moving the antennas away from directly overhead, the Arecibo telescope can observe any object between -1 degrees and +38 degrees of declination. This gives it the ability to observe anywhere in a forty degree wide cone. The spherical surface makes the astigmatism caused by off-axis



### Mercury

Mercury's north polar region as imaged by the Arecibo Observatory. The bright features are thought to be water ice in the permanently shadowed crater floors. This image was taken with the S-band (12.6 cm) radar and measures 280 miles on a side.



antennas uniform in every direction, where a parabola would be more astigmatic the farther off-axis the antennas are located.

If you are participating in either the Seti@home or Einstein@Home, the datasets that your computer is processing come from the Arecibo Observatory. While Seti@Home has not discovered any signals from little green women, Einstein@Home has discovered twenty pulsars in the Arecibo data. If any of those little green women live in M13, Arecibo transmitted a message to them in 1974. The signal consisted of a 1,679-bit pattern that formed a 23 by 73 pixel image that included numbers, stick figures, chemical formulae and a crude diagram of the telescope. The green ladies should receive the message in about twenty-five thousand years.

This is just a small sampling of the results from this observatory. However, like many science activities, funding for the observatory is being reduced. NASA cut funding for the planetary radar in 2006, but restored and increased it in 2010. The National Science Foundation has also been reducing its funding of the observatory. The NSF had provided 10.5 million dollars to support the observatory in 2007, but by 2011, it was down to only 4.0 million dollars.

The observatory is currently run by SRI International, with two other managing partners, Universities Space Research Association and Universidad Metropolitana de Puerto Rico. There are other collaborators as well. The NSF has decertified Arecibo as a Federally Funded Research and Development Center (FFRDC), allowing it to work out new funding and scientific collaboration beyond that supported by the government.

Will Arecibo survive? If additional funding cannot be found, the answer is no. In a 2015 letter to colleagues, the NSF stated that they are planning to continue to reduce Arecibo's funding. NASA's funding is none too certain with the budget cuts they are facing either. We have seen a number of observatories close due to lack of funding. Arecibo may be the next in line.

\* \* \*

### Arecibo Message

The reconstructed image of the message sent toward M13 in 1974. Will the inhabitants of M13 be able to determine what we are trying to tell them? The color was added to help delineate the different figures. The telescope is in purple near the bottom, while a human is right above it in red.

## Photo of the Month



### **NGC 1097 (Arp 77)**

Description GC 1097 (ESO 416- G 20, PGC 10488, Arp 77, Caldwell 67)

T32 (17" Planewave with FLI Proline 16803), Sliding Spring, Au Sept 2015

LRGB 7x600" each (4h40m)

Right ascension 02h 46m 19.0s Declination 30° 16' 30" Redshift  $1271 \pm 3$  km/s

Distance 45 million ly Type (R'\_1:)SB(r'l)bSy1

Apparent dimensions (V)  $9.3 \times 6.3$  arc minutes Apparent magnitude (V) 10.1 (surface brightness 22.6)

Glowing ring of stars at center probably encircle a supermassive black hole. Smaller associated galaxy is NGC 1097A. Rather than a "soft, ethereal" rendering, The processing targeted revealing as much detail, as deep into the galactic center, as possible with the images at hand. Processed in PixInsight.

Copyright Alex Woronow

## *Photo of the Month: Addendum*

### **Description**

My image of NGC 1097 (aka Arp 77) already was posted. Details of the imaging set-up, acquisition, and processing can be seen in that posting. This image was reprocessed using a PixInsight script for enhancing long wavelets. The reprocessing targeted revealing the two jets indicated on the image.

These jets are not plasma jets, but jets of stars presumably ejected from NGC 1097, for reasons unknown but hypothesized to be due to an ancient collision with another galaxy. These are the two brightest of 4 identified jets. That these jets are at all visible on the low-integration time of this image (L~1 hr) speaks to their brightness. I understand they are the most visible of any such jets known. Alex

