

The High Desert Observer

The Bulletin of the Astronomical Society of Las Cruces

October, 2009

President's Message October 2009



October is here and the Skies are clear. The Imagers are cranking up and the visual astronomers are able to see the Sky again. The scientists are also capturing their data and participating in their chosen area of the science of astronomy. Public outreach should once again be ramping up. Its time to do what we do and share what we can. School has started and the star party requests are starting to roll in. We will soon be planting the seeds of science in the young minds of our local youths. The Enchanted Sky Star Party was held October 14-17, 2009 in Socorro, New Mexico. I don't know if any of our members attended. I have heard nothing in the way of reports or Plans.

I had Laser surgery to adjust my right eye and I think it has made a big difference. I see so much better but it is still susceptible to dust and wind so I have not been doing any astronomy outside of my back yard observatory. No new news on the Upham lighting situation or the status of the local revision to the Las Cruces lighting ordinance.

The DAAC Renaissance Arts Faire is to be held Nov 7th and 8th; however, I do not know if we will be participating this year or not. I had heard nothing and have been preoccupied with personal matters the past couple months and it snuck up. John sent out an email asking if we were going to participate and indicated he would fill out the application. I volunteered to coordinate but needed more information. I have not heard anything. If we do have a booth at the Renaissance Arts Faire we will need volunteers. I will be asking for those volunteers to commit at our October meeting.

What are we as a club doing to serve the public? Nils posted an email with an unhappy club member (not from our club) which raised some discussion on just what we do to fulfill our charter. I must say I have not been as proactive as some of our past presidents and I have allowed some public service opportunities to slip through the cracks. We have not made as much progress as I would have liked on our purposed observatory and we failed to participate in some public events. We have, however, been there for the public on a regular basis and we have provided support and assistance to those that ask. I have seen many of our members reach out and support the new imagers in the club. Helping new members is, in my opinion, not a club activity it is a club member responsibility and some of our members do a much better job than others. like most volunteer organizations, 90% of the work is done by 10% of the members. I am just grateful that we have a strong 10%. If you are new to the club and feel you are not getting the help you need or think you should be getting. Speak up; we can't help you if you don't ask. When I joined the club I actively searched for the people in the club that were doing the things I was interested in, then I asked for their help. They always came through but sometimes I had to be persistent.

Your President and humble servant, Jerry Gaber

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 \$35.00 per year. Those opting to receive the ASLC newsletter electronically receive a \$5.00 membership discount. 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.

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This Month's Observer

President's Message.....	1
Next Meeting.....	2
November HDO.....	2
September Minutes.....	3
Double Vision.....	6

Next Meeting

The next monthly meeting will be held on October 23rd at 7:30 pm in room 77 at the Dona Ana Community College, Main Campus. This month's speaker will be Dave Dockery. The topic will be "Imaging The LCROSS Lunar Impact Event."

The Imaging Group will meet at 7:00pm.

Events

The next monthly dark sky viewing event will be held on the night of October 17th at the Upham site. The next monthly Moon Gaze will be held at the International Delights Cafe on October 24st. Both events begin at dusk. For information on these and other events, please see the ASLC website.

[Http://www.aslc-nm.org](http://www.aslc-nm.org)

November Issue of the HDO

A note to all members, we need more contributors! Sharpen your writing skills, share your knowledge and help bolster our newsletter! Articles for future issues should be sent to Tony Gondola by the 10th of the month. Text should be submitted as email (acgna@comcast.net) or as an attached Microsoft Word format document. All Images should be in jpg format.

If you have any questions about submitting materials for publication in the HDO, please don't hesitate to contact Tony at 373-5104, acgna@comcast.net

Thanks in advance!

Minutes, September 2009 ASLC Meeting

Call to Order:

Kirby Benson, Vice-President, Astronomical Society of Las Cruces (ASLC), called the meeting to order at 7:34 pm., 25 September 2009, Rm. 77, Dona Ana Community College.

President's Comments:

Kirby Benson welcomed the group and recognized new members or visitors present. Wayne Freers, Las Cruces resident and recent retiree, has always enjoyed astronomy as a hobby but now wants to see how the “big boys” do it.

Secretary's Report:

The minutes for the August meeting were submitted for publication in the current (September) issue of the Club newsletter, the *High Desert Observer (HDO)*. Publication of that issue is pending. Joseph Mancilla moved that the minutes from the last meeting be accepted pending publication in the *HDO*; Bill Stein seconded. The motion was passed by the members present. There was not an additional Secretary's report.

Treasurer's Report:

The Treasurer was not present at this meeting. There was no update on the status of Club accounts or an update on the Meade SolarScope order. The annual budget presentation is due and should have been made at the September meeting. There was no additional Treasurer's report.

Committee Reports:

Observatory Committee:

Rich Richins, Committee Chairman, had no progress to report.

Nominating Committee:

There was no status report.

There were no additional committee reports.

Old Business:

Club-logo Apparel – Ron Kramer was not present to report on the status of the current order of Club-logo apparel.

Meade Solarscope – No update was available from Meade; there has been no response to email. Steve Barkes will continue research into other vendors and brands.

White Sands Star Party (WSSP) 2009 – Rich Richins gave a brief report on WSSP 2009. There was rain and hail Friday night and only about one hour of weather for observing. There was good weather starting the day Saturday, but it got cloudy as the day progressed. Gusty breezes and blowing sand caused several day-time activities to be canceled. There were many very good and well-received presentations. Good weather and a good turn-out of the public were present for the Saturday evening activities. Unfortunately, it turned cloudy as it got later and wasn't very good for viewing or astro-photography after the public left.

Galilean Nights - Part of IYA 2009, there was no expression of Club support for this event.

Southern New Mexico State Fair, 2009 – There was no Club support for manning an astronomy booth with the Astronomy Department at the State Fair.

Star Parties – Jerry Gaber has been in discussions with Allen Scott of The Albuquerque Astronomy Society (TAAS) about a joint club star party. They are looking at a November event probably at Valley of Fires State Park. Please let Jerry know of your preferred date for this event. There was no update on this event.

HDO articles – Tony Gondola NEEDS ARTICLES for each issue. Brief articles are fine and will be appreciated. Please submit them to him by the 10th of each month.

There was no additional old business discussed.

New Business:

Star Parties – Bernie Joplin, Outreach Coordinator, was not present. There was not update on upcoming school star parties.

Pre-meeting Presentations – Thanks to Steve Bakes for tonight's presentation on star gazing gadgets. Ron Kramer will present prior to the October meeting. Need a volunteer for November.

Magdalena Ridge tour – A tour of the new observatory at Magdalena Ridge in November is a possibility, perhaps in conjunction with the star party at Valley of Fires State Park.

Presenters – Program presentations for the rest of the year were discussed. Fred Pilcher volunteered to present a program on light curve photometry either in October or November. Bill Stein volunteered to present at the other month. Kirby Benson will coordinate.

November meeting – The November meeting will move to the 3rd Friday, 20 November, to avoid conflict with the Thanksgiving holiday.

Renaissance ArtsFaire, 2009 – This year's Faire is 07-08 November; John McCullough will contact the Dona Ana Arts Council or Nils Allen to determine status of planning.

Las Cruces lighting Ordinance – A rough draft is available for review and comment. There is no enforcement provision included and all currently legal lighting already in place will be “grandfathered” in under the proposed ordinance.

For Sale items – No items were offered for sale.

Membership Renewals – The issue of membership renewal was raised since the Treasurer was not present at tonight's meeting. John McCullough recommended sending the renewals to the ASLC PO box. Bert

Stevens checks it regularly for the Treasurer.

Computer System question - Fred Pilcher has a question concerning Office 2007 that he needs help with. Please get with him following the meeting.

There was no additional new business for discussion.

Rich Richins offered a motion to adjourn and Fred Pilcher seconded. The motion passed and the business portion of the meeting was adjourned at 7:46 pm.

Announcements:

There were no announcements made.

Presentation:

This month's program was "Imaging or Observing the LCROSS Lunar Impact Event" by Club member Dave Dockery. Dave had made this presentation at WSSP 2009 (based on Chas Miller and Ryan Hamilton's efforts) about looking for water on the Moon in permanently shadowed craters. Multiple observatories on Earth and in orbit will attempt to view the impact/plume event. NASA also wants imaging attempts by amateur astronomers. With about two weeks to go until the event, final preparations are/should be in work, including rehearsals. A bad sensor caused unplanned use of about ½ of the maneuvering fuel on board the vehicle. It appears that the event will take place just about as planned. The choice of target crater is still being firmed up, but Cabius is the prime candidate. Dave, Chas, and Ryan talked about predictions for the plume and challenges for amateurs to capture the event. They also discussed possible strategies to capture the event. Bottom line: practice, practice, practice. This presentation was not recorded for rebroadcast on the Internet. Other meeting presentations can be accessed on the web at <http://www.aicsresearch.com/lectures/aslcnm/>.

The September 2009 monthly meeting concluded at 8:54 pm.

-Respectfully submitted by John McCullough, ASLC Secretary

Astronomers and Friends,

Due to the popularity and great support of the Star Party events we have had this summer; Carlsbad Caverns National Park will be hosting two more Star Parties. We would like to invite local astronomers, star gazers, or night sky admirers to join us, participate, or bring a telescope. Please contact me of your interest and how we might be able to assist you in attending or partnering with us for these events. The additional Star parties will be held; October 17th and November 17th. Feel free to pass this information along to others.

Sincerely,

David Kilton, 575-785-3151

Double Vision by John Kutney

Introduction

As a new amateur astronomer, one naturally gravitates toward the “dark sky objects” such as galaxies, star clusters, and nebulas. But an unusual phenomenon happened during this process when some interesting double stars became part of my nightly venue. I was following the seasonal guideposts suggested in “Turn Left at Orion”¹. Visual Double Stars were a direct part of the script or were referenced in the neighborhood of the popular objects. These supporting observations led me to the Practical Astronomy Series book “Observing and Measuring Visual Double Stars”².

As one finds out “double stars are the rule, rather than the exception,... Current theories of star formation point to multiple stars... as the preferential outcome of gravitational protostellar material.”³ So these so called anomalies turn out to be the expected. How shocking when I found out that an old friend Polaris is actually a double star system.

Practical Drivers

Why this interest on my behalf? There are several practical drivers that peaked my interest:

1. Many double stars are challenge to locate and can be separated with an average to small telescope.⁴
2. Light pollution has less of an impact on viewing than observing DSOs. This allows more frequent viewing from my light polluted backyard in Las Cruces.
3. Some doubles are in obscure areas of the sky not necessarily “hotspots” of viewing that will provide improved viewing abilities and “sky knowledge”.
4. The evolving technology and techniques of amateur astronomers in determining double star variables such as position, orbits, separation, etc. is interesting and scientific.
5. There are lists of “neglected” double stars that require confirming and/or measurement. This may lead to a future area of my initial observing.
6. Separation of double stars provides a method to test the resolution of a telescope on a particular viewing night.

¹ Consolmagno, Guy and Davis, Dan, 2000, *Turn Left At Orion*, Cambridge University Press.

² Argyle, Bob, 2004, Patrick Moore’s Practical Astronomy Series, *Observing and Measuring Visual Double Stars*, Springer-Verlag London Limited.

³ Ibid, p. ix.

⁴ 120mm Apochromatic ED Refractor

Catalogues

It is amazing the amount of work that was required by multiple astronomers to identify double stars. There are 90000 plus pairs in the Washington Double Star (WDS) Catalogue (<http://ad.usno.navy.mil/wds/wds.html>). Many opportunities are available to confirm and observe. With access to these modern catalogues, it is no longer required to be locked into measuring and observing the popular observing guides for double stars. However, it is recommended starting with the lists of the most observed ones such as provided in [1] and [2]. The area of double stars is a natural for many amateur astronomers who want to contribute to the scientific research associated with astronomy.

Characteristics

The basics of double stars are the location of the pairs (RA & Dec.), magnitude, degree of separation, color, and the position in degrees of the orbiting star. Other aspects of doubles are orbital periods, apastron (stars at maximum separation), and periastron (stars at their closest). Stars approaching periastron is an important variable for small aperture telescopes. Porrima (gamma Virgo) which is a classic headlight pair was closing in separation for viewing with its periastron occurring in 2005 with an orbital period of 168 years.⁵ It is now more visible with a separation of about 1.4" as it moves away from its minimum.

As an amateur, truly a beginner at six months of observing, the observation of doubles has enhanced my star locating, magnitude determination, and a greater appreciation of seasonal viewing requirements.

Resolution Tests

Double stars are a great way to perform resolution tests for telescopes. Reference [2] provides tables of doubles for particular apertures based on doubles that move slowly in orbit and are related to the Dawes Limit (11.6"/D in centimeters where D = telescope aperture). Most double stars with periods between 100 and 1000 years can be seen with smaller telescopes due to their static nature. Selected catalogues from USNO categorize this set of doubles. Periods of 10 to 100 years are very rewarding to the double star observer since the pairs can be tracked over a significant portion of their orbit. Low period doubles may require significant aperture to observe the separation near periastron.

Another measure that may be part of your telescope specifications is the Rayleigh Criterion. This provides a measure of the diffraction image of two objects when there is a drop of intensity between the objects. The Rayleigh Criterion is 13.8/D where D is in centimeters for the telescope aperture. However, under certain conditions a scope may be able to separate doubles beyond this limit. I will use my 120mm refractor as an example of calculating the Dawes Limit and the Rayleigh Criterion. Of course in general the possible limits of resolution depend on collimation and environmental conditions.

120mm refractor	
Dawes Limit	11.6"/12cm = .97 arcsecs
Rayleigh Criterion	13.8"/12cm = 1.15 arcsecs

Further discussion and graphs for telescopes with obstructions can be found in the article by Tony Gondola in the High Desert Observer.⁶

Therefore, the resolution of doubles can depend on the brightness of the stars since it is easier to see a separation in a bright image. The following is a table comparing the Rayleigh Criterion and Dawes Limit for a set of apertures:

⁵ Ridpath,Ian, 1998, *Norton's Star Atlas*, Prentice Hall.

⁶ MTF Curves (Tony Gondola) March 2009, HDO.

APERTURE(inches)	DAWES LIMIT	RAYLEIGH CRITERION
3	1.52"	1.82"
6	.76"	.92"
8	.57"	.69"
10	.46"	.55"
12	.38"	.46"
16	.29"	.35"

An observation of many binaries with a range of telescopes was compiled with a nomogram.⁷

Measuring Separation, Position, and Orbits

There are several instruments that can be used to measure the data associated with doubles. Some of the methods used for orbit computation are the Geometric method and the Theile-van den Bos method. These methods are beyond the scope of this article but use basic math and geometry⁸. But of course you would need the underlying data for the calculation either from collected data or measurements using special instruments or techniques.

The smallest separation I have observed is Castor at 2.2" and Porrima at 1.4". Alpha Pisces at 1.7" will be the next separation challenge in my current plans to obtain the Astronomical League's Double Star Certificate that includes a robust selection of 100 double stars. However, as noted, observations may exceed the Rayleigh Criterion.

Observing

Doubles can be divided into four categories according to Jerry Spevak⁹ an observer from Canada: separate, touching, notched, and elongated. These categories were based on a 70mm refractor with 137X and 200X powers. Observing with your scope and aperture may produce different results on the same stars but the categories will be similar. It is easy to pass from one of the above states to another on the same star with a change of the eyepieces and Barlow's that are used.

Instruments and methods of observation of measurement are varied. Three standard techniques were employed using the ring method, chronometric, and reticle eyepieces. Details of measurement are described in Argyle [2]. Illuminated reticle eyepieces seem to be more practical but are not your typical eyepiece. Meade and Celestron produce these eyepieces. See Figure 1 for examples. Details of specialized eyepieces can be seen at <http://www.scopetronics.com/reticleep.htm>. Other ways to measure are with micrometers and CCD cameras.

The CCD camera approach sounds interesting since one can use the CCD for imaging and other tasks. The CCD approach for doubles requires techniques of astrometry and photometry. The basic observation of position angle, separation, and magnitude can be made with the CCD. The CCD pixels are uniform in the image and can provide accurate results. The separation can be calibrated in arcsecs and the position angle can be determined from the star drift.

Speckle Interferometry is a new method for double star observing. Computer software and applied math play a significant role along with video cameras in lieu of CCDs with high speed shutters for the amateur.

⁷ Lord, C.J.R. (see Haas, S., 2000, Sky & Telescope, 102,118).

⁸ Ibid., Argyle, Bob.

⁹ Ibid., Argyle, Bob

Elacrab(Xi Scorpius) a Surprising Double

The 100 double stars required for the Double Star Observing List from the Astronomy League visits multiple constellations. Obtaining the list requires a seasonal approach to capture all the double stars. I started on the double star plan while visually observing at the ASLC DSO at Upham, New Mexico but the bulk of observing has been from Las Cruces. I have completed over 40 doubles in a short period but this has been challenging due to the local weather conditions, transparency, and seeing in the Las Cruces area. I focused on the summer doubles with many at or near the zenith. This has also been a good “yoga” exercise using a refractor telescope.

The Astronomy League requires sketches of the observed double stars to indicate the position angle and observed separation with the associated magnification. The first full night dedicated to doubles was not very rewarding as my technique needed some improvement. The next night built upon my experience in finding and plotting the observed doubles. Porrima (gamma Virgo) was on the top of my list as the separation was close and Virgo was drifting to the west.

The most exciting and “wow” observation has been Elacrab. Getting there was half of the excitement(if you’re into double stars). Starting at Graffias (beta Scorpius) which is also a nice double, one goes North two Finder Scope (5 deg) lengths to an empty area between Ophiuchus, Libra, and Serpens Caput. [See Figure 3.] Elacrab was an amazing view with the double looking like a planet with a nearby moon orbiting it. The Elacrab system consists of double stars with magnitudes 4.8 and 7.3 with a separation of 7.6''. But, that’s not all that is in the area. Struve 1999, Struve 1998, HIP 78738 and HIP78739 are also there in the eyepiece with a little nudge with magnitudes of 7.4 and 8.1 with a 11.6'' separation. With a wider field one can get a very nice double-double. [See Figure 2]. Finding and observing the area around Elacrab has been the highlight of my double star observing up until this point.

Double Star Goals

Immediate goal is to obtain the Double Star Observing Certificate from the Astronomical League. Secondly, observing some of the more difficult doubles that are not part of the list, testing both observing and equipment limitations. Try Sirius? Sirius is a difficult double due to the glare of the Main star (Sirius A) and the magnitude of its double. The smaller member of the pair is 10000 times as faint and is very difficult to observe. An aperture mask with the doubles closer to apastron (11'') is required and still may be impossible with a small scope.

Beyond the above it makes sense to measure some of the basic characteristics of both an easy and difficult double star system. The popular “70 Ophiuchus” is certainly a candidate since one can track the full orbital cycle of the system over a period of time. As one becomes more familiar with double stars alternate opportunities may evolve.

The CCD approach seems most practical and provides a feasible direction into imaging and Astrophotography. It is also appealing to use the standard measuring reticle eyepieces and endeavor to use the mathematics and software required to interpret the results. Variable stars also fall into the double star gende and opens another avenue for amateur contributions to astronomy.

Figure 1 - Reticle Astrometric Eyepieces



Meade 12mm MA Astrometric Illuminated Reticle Eyepiece

A high-precision eyepiece for a wide range of astronomical measurements. Includes four red-illuminated laser-etched scales for measuring double star angular separations, position angles, planetary diameters, lunar crater diameters, and for long exposure photo-guiding. Modified Achromat 3-element coated optics, diopter adjustment, rubber eyecup, and variable LED illumination control and batteries.



Celestron 12.5mm Micro Guide Eyepiece

This multi-function guiding eyepiece features a laser-etched reticle with a built-in battery illuminator. The eyepiece is a multicoated 12.5mm Abbe (4-element) Orthoscopic. Usage possibilities include: direct guiding on stars outside the center of the field of view; greatly improved off-axis guiding to capture much fainter, sharply focused guide stars without reducing limiting magnitude; and measuring position angles and separation of double stars. The Micro Guide Eyepiece is totally free of internal reflections and offers sufficient eye relief for the reticle to be viewed easily, even with eyeglasses. Its finely etched micrometer scale has gradations 50 microns apart and 15 microns wide. Included are: the eyepiece, built-in cordless illuminator with adjustable brightness control, batteries and instructions. The apparent field of view is 42°.

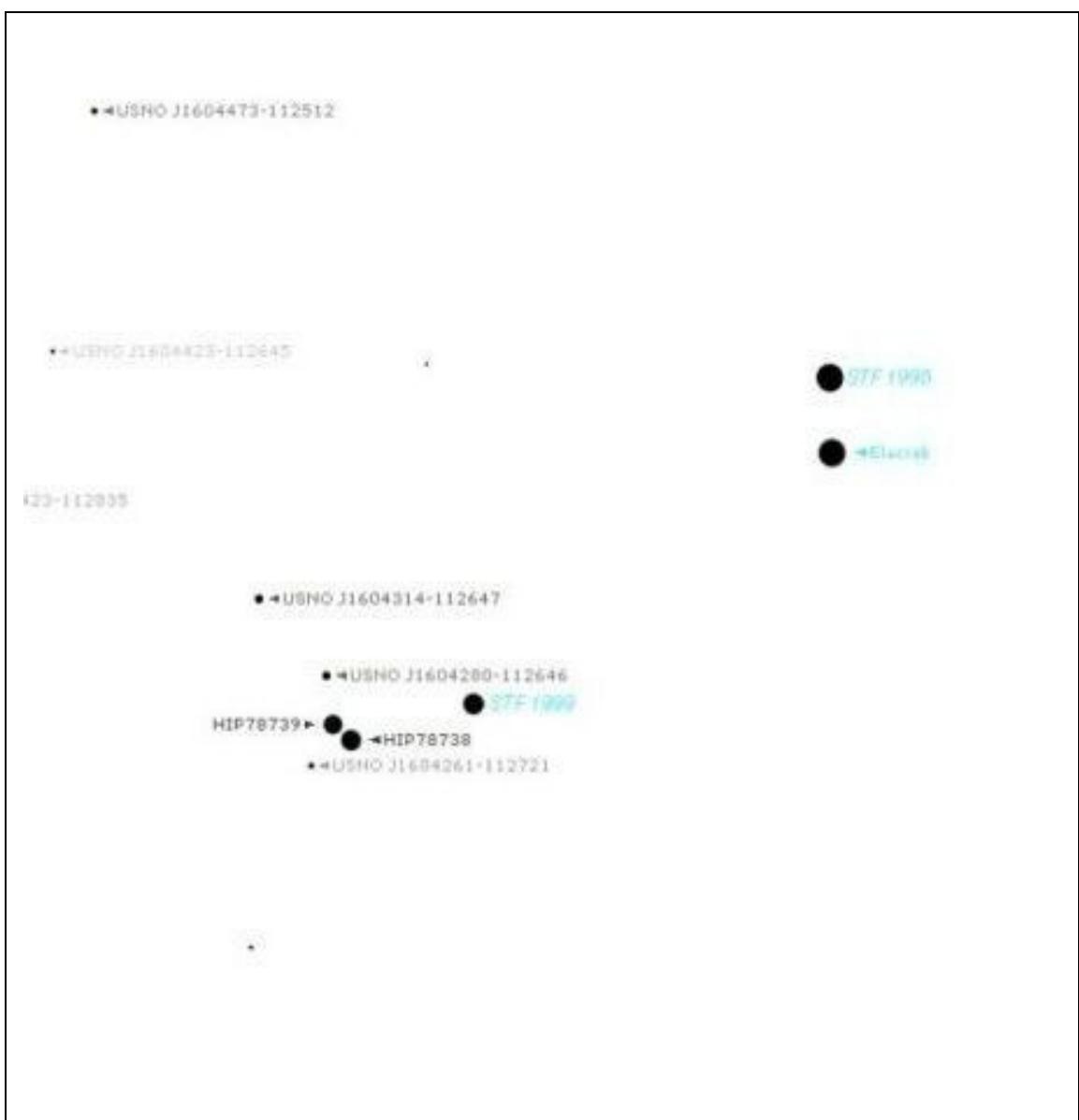


Figure 2 Elacrab/ Struve 1999 and 1998

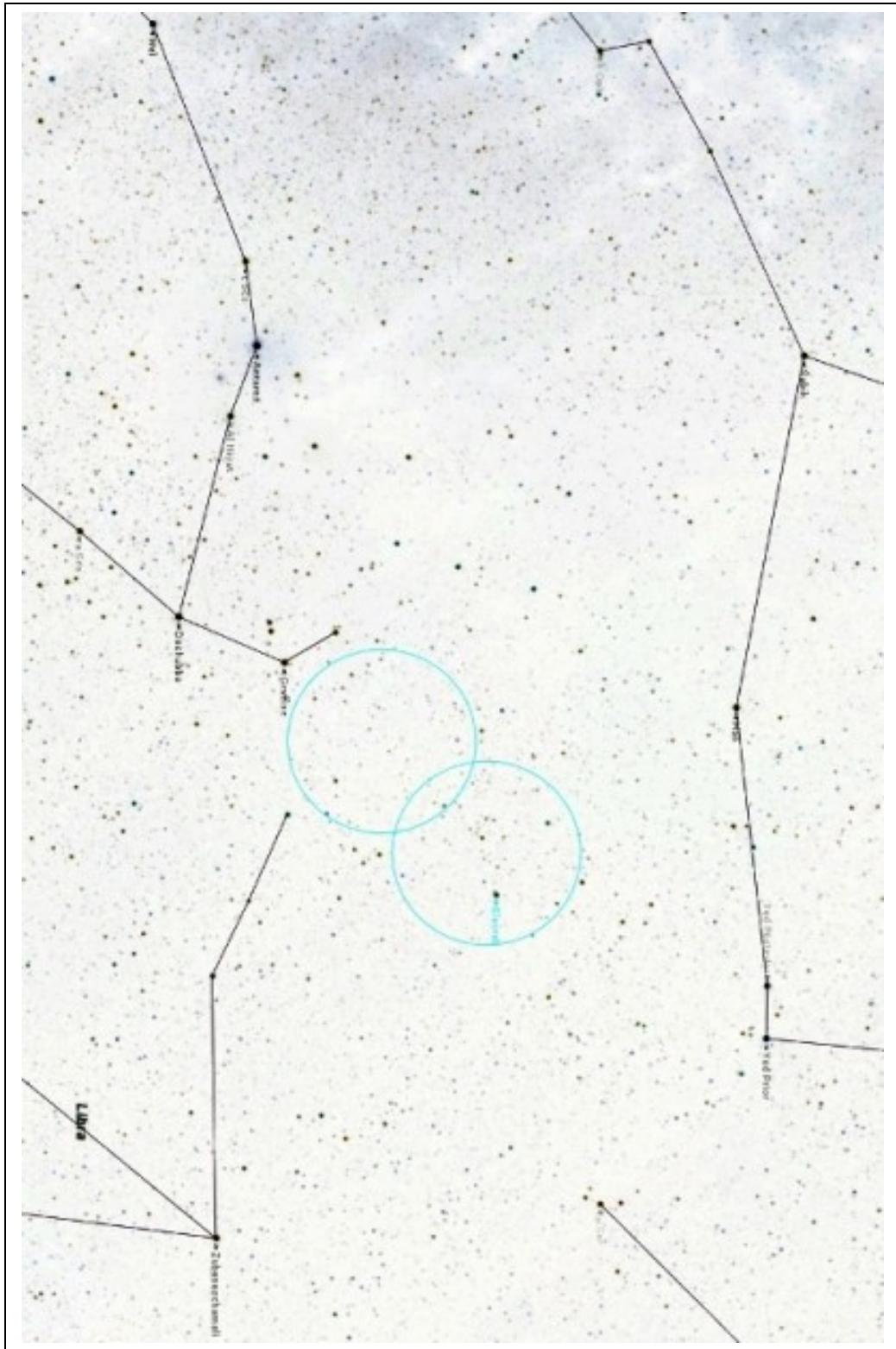


Figure 3 Elacrab Star Hopping

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ASLC - Sharing the Universe
With Our Community
for Over 50 Years

