



# RVAS

Roanoke Valley Astronomical Society



News About Amateur Astronomy  
In Southwestern Virginia  
<http://www.roavas.org>

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## A LIGHT CURVE FOR ALGOL

By Michael Good



Figure 1 - Algol, combining the 161 one-second images used for our light curve.

Algol is an eclipsing variable. It varies from V (green=visual) magnitude 3.4 to a maximum of 2.1, or a difference of 1.3 magnitudes. Algol is in eclipse for 10 hours, and this eclipse occurs every 2.867315 days. I was curious if I could obtain a light curve by performing photometry on Algol.

Photometry (Photo – Light, Metry – Measure) can be accomplished **1)** visually by comparing a target object against neighboring stars of

similar and known brightness, **2)** photographically by taking photos of the same duration and preferably the same sky transparency and measuring the diameter of a star using a measuring engine (best done on a glass plate where the photographic emulsion does not stretch as cellulose might), and **3)** using a Charge Coupled Device (CCD).

Visually an observer can compare a star if they have close reference

stars of similar magnitudes. I had a college astronomy project to produce a visual light curve of Delta Cephei. Photographically, amateurs don't use glass plates, but even with 35mm film, you can still use a fine scale and compare sizes of stars on your negatives. For accuracy, this used to require a measuring engine, which is a device that will measure locations and widths of stars with a scale in microns. A practical solution is to scan the negatives (or prints) and then use photometry software on the images, but this can introduce many errors in your data.

The CCD approach yields the most accuracy, is the tool of choice for astronomers, and can be used by amateurs with extremely modest optics to produce accurate photometric magnitudes with accuracies approaching 0.01 magnitudes.

There are two major types of photometry: Differential and All Sky. All Sky Photometry requires measuring the air mass and determining extinction coefficients. This just means that when a star is closer to the horizon, it must pass through more of our atmosphere

See Algol, Page 4

Don't forget to start getting your astrophotography and night sky images together for the RVAS Photo Competition. The competition takes place at the April RVAS meeting. **See the Upcoming Events list for info on VAAS 2006**

## **FEBRUARY RVAS MEETING NOTES**

By Mark Hodges - RVAS Secretary



### **MYSTERY OBJECT**

Can you name this object, as well as the main feature in this photo?

Send your best guess to Dave Thomas, our Mystery Object Columnist, at

thomasde-ka8inl@worldnet.att.net

There were **19 members** in attendance.

**Katherine Hix** opened the meeting and **Lynn Slonaker** gave a treasurer's report.

Observing reports, **Mike Overacker** reported that he has "looked at a bunch of stuff"

**John Goss** reported on Mike Overacker's article on the AstroBus in the Reflector, so check out the Reflector when it comes out.

**Mahesh Taylor** has been given a gift certificate for his years as the website's webmaster.

Thanks Mahesh.

**Roger Pommerenke** has been appointed as the new webmaster.

**Katherine Hix** reported that Neil Hobbs from the Blue Ridge club will give a program on Solar Observing for the March meeting.

**Genevieve Goss** made a suggestion of forming a committee to look into getting insurance for the club for public observing sessions.

**Mark Hodges** gave a presentation on collimating Newtonian reflector optics.

**Mike Overacker** presented the constellation of the month, Auriga.

**John Goss** gave a talk on all the different Astronomical League's observing programs that are available for members of the AL.

**Katherine Hix** gave a talk on the AL's double star program. †

## **ASTRO-QUIZ**

The sun actually travels though 13 constellations in the ecliptic in the course of a year. How many constellations does the Moon course through?

Answer to Last Month's Astro-Quiz: Last month we asked where in the sky would you look if you wanted to see the most Messier objects at one time in an eyepiece that has a one-degree field of view? If you pursued the Messier observing program, you know that Virgo/Coma and Sagittarius/Scorpius areas are replete with such objects. But even in these areas you won't find three Messier objects that fit in a one-degree field. In fact, the only three Messier objects that can be seen within a one-degree field are M31, M32 and M110 – the Andromeda galaxy and its two companions. The distance between M32 and M110 is slightly more than 55 arcseconds, with M31 lying in between

The Roanoke Valley Astronomical Society is a membership organization of amateur astronomers dedicated to the pursuit of observational and photographic activities. Meetings are held at 7:30 p.m. the third Monday of each month at Center in the Square in downtown Roanoke, Virginia. Meetings are open to the public. Observing sessions are held one or two weekends a month at a dark-sky site. Yearly individual dues are \$20.00. Family membership is \$25.00; student membership is \$10.00. For information, call the RVAS Message Line at 540-774-5651. Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS, its editor, officers, or individual members.

**RVAS web page: <http://www.roavas.org>**

**Officers/Executive Committee:** **Katherine Hix**, President (334-2443); **Mike Overacker**, Vice President and Newsletter Editor (776-3092); **Mark Hodges**, Secretary (774-5039); **Lynn Slonaker**, Treasurer (774-5695); **Bruce Jones**, Executive Committee Member-At-Large (774-3844); **Paul Caffrey**, Immediate Past President (345-2847); **Dave Godman**, Past President / New Member Coordinator (774-3337); **John Goss** and **Genevieve Goss**, Outreach Coordinators (966-4606); **Frank Baratta**, Membership and Public Viewing Coordinator (774-5651); **Roger Pommerenke**, Web Master (774-5823)

# THE LOCAL GROUP

By Genevieve Goss

The RVAS newsletter continues to wobble in its orbit, which should prompt members of the Local Group to examine how this entity serves the club and its members. THE RVAS Constitutions states that "Each member should be notified in advance of every meeting, observing session, and of every other function planned by the Society." The preferred method of notification will be through the Society Newsletter." So...eliminating the hardcopy newsletter will only be possible when the entire membership is able and willing to receive the newsletter electronically. Please consider what's needed in terms of a newsletter, in what format and

frequency, and what you can do to help facilitate it. Then email a club officer to let them know your ideas.

Speaking of the RVAS Constitution, it's an Election Year for the club. According to the Constitution, the Club President (Katherine Hix) appoints a Nominating Committee which will propose a slate of officers. The slate will be published in the Newsletter and announced at the club meeting. Within 15 days of the publication of the slate in

the newsletter, any qualified club member can also submit his or her name for the candidate list, by presenting a petition signed by 10% of the club members (8 or 9 members) to the Club Secretary (Mark Hodges). Election of officers will occur at the June Meeting.

Many events are on the horizon for the Local Group: RVAS Astronomy Day (May 6 in Elmwood Park), MERAL meeting/ Green Bank (WV) Star Quest (June 21-24, 2006) and ALCON Expo Dallas (Arlington) on August 4-5. †

## STRAWBERRIES FOR ASTRONOMY DAY?

By John Goss

The 2006 edition of Astronomy Day is fast approaching! On May 6th, amateur astronomy clubs across the nation showcase their hobby to the public by conducting an all day outreach event. This is a chance for members to bring out their telescopes and gear in the daytime.

May 6th also happens to be the date of Community School's annual Strawberry Festival in downtown Roanoke's Elmwood Park. Between 10:30 a.m. and 5:30 p.m. upwards to 55,000 people will stuff themselves with all sorts of strawberry creations. Wouldn't this be a great venue for an educational group such as the RVAS to engage the public? The folks at Community School think so.

The RVAS will have a telescope display for public viewing of the moon and the Mill Mountain

Star. Of course, the sun will be featured both in white light filtered telescopes and in the club's new hydrogen alpha solarscope. Festival goers will not come away disappointed! Plus, there will be several tables for exhibits, displays, and handouts.

Evening observing is tentatively scheduled in the downtown Market area for a "Moon over the Market" session. The eight-day-old moon will be ideally situated for great views along with the always popular Saturn. For once, light pollution won't be a problem!

Participants are needed! If you have a telescope or display you'd like to show, why not sign up for Astronomy Day 2006? Contact one of your club officers today!

Now, if only the weather cooperates!

### LAST MONTH'S MYSTERY OBJECT

The January/February Mystery Object is NGC 2237, the Rosette Nebula. Located in Monoceros it is 3,600 light years distant at RA 6h 29m and Dec 5 deg 5m.

The nebula is associated with a cluster of 16 stars, NGC2244. This cluster is the only thing visible in smaller scopes. The stars in the cluster were formed from the gas of the nebula.



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# ALGOL

Continued from Page 1



Figure 2 - Blooming tails at minima and maxima.

than when the star is at our zenith, and this has the effect of dimming the star's light. When your goal is to MEASURE the light, you need to account for this. Here on the East Coast, our skies are not "photometric", meaning we get changes in our night sky from hour to hour, or indeed minute to minute. To combat this problem, differential photometry is used. With differential photometry, you compare your target star against a reference star in the same Field of View, and then you compare your reference star against at least one other reference star. By convention the labels of the target object being measured is "V" (variable), the first comparison star is "C" (comparison), and the second comparison star is labeled "K". You can obtain much higher accuracy by adding more comparison stars. This is referred to as Ensemble Photometry, and each comparison star is labeled C1, C2, etc.. Most CCD control software includes the capability to take, and measure, a series of images. Three popular routines used by amateurs are Maxim DL, CCDSOFT, and the image processing software AIP4WIN that comes with an extensive book on Astronomical Image Processing. The goal is to obtain results where the C-K (comparison star #1 minus comparison #2) is a constant unchanging value over time. This represents your error. Lets look at my results for the eclipsing binary star Algol, where

a smaller binary star passes in front of (eclipses) the primary, causing a drop in the overall light coming from the two stars. I used a 10" Meade LX200 with an SBIG ST10XME CCD. The ST10xme is a micro-lensed non-anti-blooming (NABG) CCD. NABG means that the stars will "bleed" when the photo-sites are saturated. When taking photometry data, you need to know that all the star's light is captured in the CCD array. While you can use ABG CCDs for photometry, care must be taken to verify the data is captured in the "linear" part of the detector. This is very difficult to do with bright stars such as Algol. There are tricks (aperture stops, barlows, defocusing) that can be used to allow longer exposures to be used for a bright star. You should normally use at least 10 second exposures to prevent the twinkling

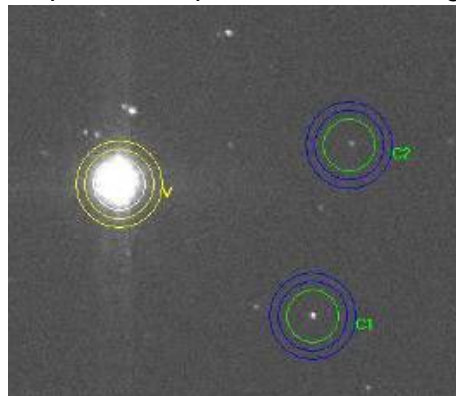


Figure 3 - inner circle for counting photons of target, outer annulus to capture and subtract sky brightness.

Algol - Dec 19, 2005

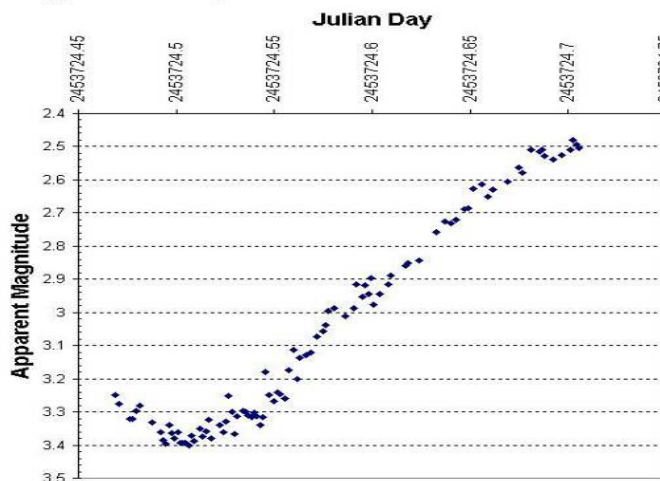


Figure 5 - Final light curve showing Algol from before minima to before maxima. Taken at Mike's Place Observatory (MPO) by Michael Good. Reduction using Ensemble Photometry via AIP4WIN.

(scintillation) of our atmosphere from affecting the results (I used 1 second... oops). Also, you should ensure that guiding/tracking is enabled. This was also not done in my case. My data was taken Dec 19, 2005. I started my LX200 with CCD capturing data, and then catch this: I went to our astronomy club December social, and while I was down in Roanoke, my locked observatory had the roof open and was taking multiple hours of photometric images, using a timer to take an image every 2 minutes, starting at 6:14pm, and taking images through to 11:55pm (5hrs 41 minutes). My goal was to try to capture at least half the known 10 hour eclipse. In my resulting light curve, you can see the data starts just before minima, and then ends just before maxima (rats).

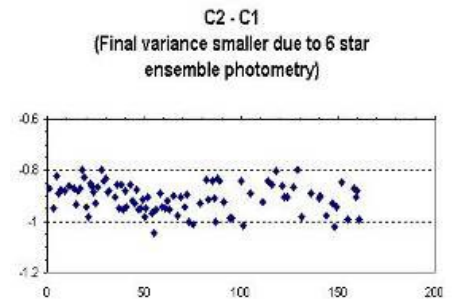


Figure 4 - Raw error of first two comparison stars (<0.2). Resulting photometry is even better due to using six comparison stars.

# UPCOMING EVENTS

## **ASTRONOMY DAY - ROANOKE CITY MARKET AND ELMWOOD PARK - ROANOKE, VA - MAY 6, 2006**

The RVAS is making plans to hold our Astronomy Day activities on Saturday, May 6, 2006 at the Strawberry Festival and Chili Cook-Off. This event will be held in the Roanoke City Market and Elmwood Park area. Weather permitting, observing sessions may also be scheduled that evening in some darker locations. This is a RVAS event, and we will need all the volunteers we can get. We have given 3 months advanced notice so you can schedule this day for the RVAS and Astronomy.

## **NEAF 2006 - ROCKLAND COMMUNITY COLLEGE - SUFFERN, NY - MAY 6 AND 7, 2006**

NEAF (North East Astronomy Forum) is an annual event held by the Rockland Astronomy Club in New York. The event is held at the Rockland Community College at 145 College Road in Suffern NY. This event is heavily attended by astronomy enthusiasts from up and down the east coast and by astronomy vendors from around the world. Information will coming soon at the Rockland Astronomy site at [www.rocklandastronomy.com](http://www.rocklandastronomy.com).

## **ALMOST HEAVEN STAR PARTY - SPRUCE KNOB, WV - AUGUST 24-27, 2006**

NOVAC is pleased to announce that we will be holding our second annual Star Party at Spruce Knob, West Virginia on June 2-5, 2005. The event will be held at The Mountain Institute in one of the darkest areas on the east coast at an elevation of about 4200 feet. Please check the web site for more information. We will be adding details over the next few weeks. <http://www.novac.com/AHSP/index.php>  
Registration will open on February 15, 2006 and it can be done completely on-line. If you have questions, send an email to [AHSP@NOVAC.COM](mailto:AHSP@NOVAC.COM).

## **VAAS 2006 - RANDOLPH-MACON COLLEGE - ASHLAND, VA - SEPTEMBER 30, 2006**

RVAS is happy to announce that the Richmond Astronomical Society (RAS) is the host club for the Annual Convention of the Virginia Association of Astronomical Societies (VAAS). This years convention will be held at Randolph-Macon College on Saturday, September 30th, 2006. Speakers are being acquired at this time and will be listed in the RVAS newsletter as the details become available. The Richmond club had good attendance at our event in 2005, and I hope that the RVAS members will attend their event as well. This is a "Must Attend" event for any astronomy enthusiast.

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## **THINGS RVAS MEMBERS MIGHT WANT TO DO THIS MONTH**

1. Attend the RVAS March meeting on Monday, March 20, 2006. This will be a great learning opportunity for all club members. Isn't that why you joined the RVAS?
2. Make a list of things that you would like to know more about involving Astronomy. Also, areas that you might have the sufficient knowledge to help others in that realm of knowledge. Also, write an article for the Newsletter. That is something that every member of this club should do. The RVAS is what you make it. More members involved means a better club. When you come up with a list or article, send it to me at : [mike@overacker.com](mailto:mike@overacker.com)
3. Do some observing. Preferably, do some observing with some other club members. Sure, it might be cold, but that is what layers of clothing are for. The vast majority of club members have never been seen at RVAS programs, or out observing with other club members. Why not start now?
4. Volunteer to help with Astronomy Day activities, or other club activities. A large part of the activity and outreach of the RVAS is being done by a few people. This is not fair to those few, or the club. It makes no difference how much, or how little, you know. What counts is that you are willing to be a part of the RVAS. Remember, the RVAS is here to promote astronomy, the RVAS, and to have fun. You can't have fun if you don't show up.

# ***Society Events and Activities for March 2006***

**MONTHLY MEETING:** Monday, March 20th, 7:30 p.m. fifth floor meeting room, Center in the Square, downtown Roanoke. The meeting program will be Neil Hobbs from the Blue Ridge Astronomy Club speaking on Solar observing and Mike Overacker will speak on the use of the Forum on the RVAS Website.

**“MEMBERS ONLY” WEEKEND OBSERVING SESSIONS:** Unless otherwise noted, observing sessions are held at Cahas Mountain Overlook, milepost 139 on the Blue Ridge Parkway.

Friday and Saturday, 17th and 18th. Sunset is at 6:30 p.m. Astronomical twilight ends at 7:56 p.m. The Moon rises at 9:18 p.m. and 10:21 p.m., respectively.

Friday and Saturday, 24th and 25th. Sunset is at 6:36 p.m. Astronomical twilight ends at 8:04 p.m. The Moon rises at 12:57 a.m. and 2:14 a.m., respectively.

Friday and Saturday, 31st and April 1st. Sunset is at 6:42 p.m. Astronomical twilight ends at 8:12 p.m. The Moon sets at 9:45 and 10:58 p.m., respectively.

**April Sessions:** 21st and 22nd; 28th and 29th.

**FRANKLIN CO. PARKS DEPT./RVAS PUBLIC STARGAZE:** Saturday, March 25th, 7:15 p.m., Franklin Co. Recreational Park. For Franklin Co. residents. 774-5651 for Info. (Next session: May 27th, 9:15 p.m.).

**ROANOKE CITY PARKS DEPT./RVAS PUBLIC STARGAZE:** Saturday, March 18th, 7:00 p.m., Cahas Overlook, milepost 139, Blue Ridge Parkway. For City, County and other area residents. RVAS members are welcome to participate. Call the RVAS Message Line, 540-774-5651, for information.

**RVAS EXECUTIVE COMMITTEE MEETING:** To be announced.

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