My First Experience Using An Autoguider
By David Brandt

In simple terms, an autoguider provides real-time feedback to a telescope’s tracking motors that helps attain a better tracking solution. Once set up, a telescope’s standard tracking motors are essentially blind to their environment. They assume perfect gears and perfect telescope balance. In contrast, the autoguider is able to see a portion of the sky during tracking and use what it sees to provide feedback that corrects small tracking errors. This is critical for getting good pictures through the telescope when long exposures are involved.

Previously, I’ve had to limit my nighttime investigations to taking pictures of just ten seconds exposure each, due to the tendency of my telescope motors to introduce a periodic and undesirable adjustment (read: a jerk) that made some of the exposures unusable. I had to throw out the ones where the jerk occurred. After identifying the usable exposures, I combined some or all of them in a process called “stacking.” Theoretically, stacking gets you the equivalent of a longer exposure (e.g., ten ten-second exposures stacked equals a single one-hundred-second exposure), but I had serious doubts about that.

On August 17, the night of my first attempt at using my autoguider with my telescope under the night sky, my thinking about all this was as follows: If the autoguider does a good job, it will streamline my process, and I won’t have to put up with generating a lot of bad exposures and going through the trouble of stacking anymore. And here is how it went:

The setup, cabling and alignment of my telescope, laptop, CCD camera and autoguider took about one hour and 20 minutes.

After aligning the telescope with three bright stars, I pointed it at a random area of the sky near the last star used for alignment. I then adjusted the autoguider. So far, everything was going well. All indications were that the autoguider was doing a good job.

I set up the CCD camera for a thirty-second exposure. It was a long time to wait, but the picture turned out to be gorgeous, so I tried a one-minute exposure. It also was amazing, so I tried a two-minute exposure.

At this point I was thinking about going for a three-minute shot, but I decided to first redirect the telescope to a known asteroid. Using the computer program called C2A, I looked for a nearby asteroid that would push my setup’s limits. I found one that was estimated to be of magnitude 17.7; even with stacking, I would normally have a very hard time identifying an asteroid that dim.

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Stories Wanted: *Gemini* is written entirely by our members, for our members! *Gemini* needs your stories… how you first became interested in astronomy, how your interest has evolved over the years, equipment you use, star parties and events you’ve attended here and elsewhere, how you’ve encouraged others — especially young people — to get involved in this fascinating hobby. Submit your stories to: brownreveugeene66@gmail.com

E-mail Update: If your e-mail address has recently changed, chances are your address used for MAS email distribution lists is not current. Please inform Bob Brose of your new e-mail address at bob@qbjnet.com
I ordered my telescope to move to that position, and I set up the autoguider again. It didn’t go as easily as the first time. I decided that this was because there wasn’t a bright star for the autoguider to automatically lock onto, so I manually found a dim star that looked like it should work. The first exposure wasn’t good. I tried again, but still not good. At this point I wasn’t sure what was going on. I played with the autoguider setup some more, and it appeared to be working, but the star it was using was changing brightness.

One of the problems was that the power lines above my backyard fence were getting in the way. Solution: Pick a star to guide on that was away from the lines. The other problem was that I was looking at a computer screen instead of looking up at the stars as I used to do. When I looked up, I realized that the main reason the guide star was oddly changing brightness was the presence of cirrus clouds moving into the area. If I had looked up sooner, I would have seen that.

At this point, I shut everything off and called it a night. However, after putting everything away, I looked at one of the failed exposures with Astrometrica, a computer program for identifying objects in a picture, and guess what! The autoguider had found that asteroid.

I am enthusiastically looking forward to the next clear night.

Equipment Used in This Story
- Celestron C8-NGT 8"
- Astrometrica for analyzing Newtonian telescope exposures
- SBIG STV autoguider
- SBIG ST-402ME CCD camera
- C2A for controlling the telescope
- CCDSoft for controlling the camera

David Brandt, a member of MAS, currently spends his free time contributing position data for known asteroids to the Minor Planet Center from his backyard observatory, which is registered with Minor Planet Center as G49 Minnetonka.

The author would like to thank his friend, Steve Kladstrup of Rochester, NY, for his editing assistance with this article.
The Alamogordo Astronomy Club

By Jim Fox

When we both retired from 3M, my wife Stephanie and I began to scout around for a possible location outside of Minnesota to which we might move. Without detailing all the locations we considered, we finally found the New Mexico southern skies astronomical enclave in the Sacramento Mountains of New Mexico. Located at an altitude of 7,300 feet, this area has provided exceptionally dark skies, with many nights of sub-arc-second seeing — as indicated by the 30-second exposure of my Makalii Observatory. Those who have visited the Rice’s New Mexico Skies bed and breakfast, just up the ridge from us, know what I mean.

However, these dark skies did not come without a price. Our nearest shopping, other than a couple of convenience stores, is 35 miles away in the town of Alamogordo. (Think of living in Afton and doing all your shopping in Minnetonka.) Alamogordo, Spanish for “fat cottonwoods,” is a city of 35,000 located in the Tularosa basin at the foot of the southern Sacramento Mountains. Besides offering shopping, it is near White Sands National Monument and Missile Range, Holoman Air Force Base, and the New Mexico Museum of Space History. While visiting the museum, shortly after moving to the area, I learned of the Alamogordo Astronomy Club (AAC).

Public outreach is part of the unofficial mission of the AAC. Besides Astronomy Day and occasional star parties, a major effort is put forth each fall for the White Sands Star Party. The nearby national monument opens its grounds for an all-nighter; members set up portable telescopes and the public is invited to come and observe. Most of the guests give up between 10:00 and 11:00 p.m., and club members have the rest of the night to themselves. White Sands is also the usual site for the club’s Messier Marathon each March.

The AAC is a small but enthusiastic group of amateur astronomers who meet monthly to share observing experiences, plan public outreach events, and learn about astronomy in a social setting — just like many other astronomy clubs around the country. Although Alamogordo hosts a branch of New Mexico State University, it has no astronomy department. Club members give most of the club’s programs, many of which are of the “what I’ve been doing in astronomy lately” variety. These tend to promote camaraderie among the members and spark ideas of new ways to explore the heavens.

This view of a regional hospital shows the effect of full cut-off lighting as required by Alamogordo city ordinance. The grounds of the parking lot are fully illuminated, but no light escapes upward from the fixtures. The area beyond the hospital shows illuminated utility poles, but there is no upward-escaping light.

The AAC sits on the grounds of Buena Vista Elementary School in Alamogordo. Thanks to lighting restrictions within the town, the observatory lives up to its name, providing beautiful views of the heavens.

The 12½ inch Cave Astrola telescope within Buena Vista Observatory is used by club members for their own projects and to provide astronomical experiences to school children, scouting groups, and the general public.

This view of a regional hospital shows the effect of full cut-off lighting as required by Alamogordo city ordinance. The grounds of the parking lot are fully illuminated, but no light escapes upward from the fixtures. The area beyond the hospital shows illuminated utility poles, but there is no upward-escaping light.

The New Mexico Museum of Space History is set in the foothills of the Sacramento Mountains, above Alamogordo. Besides the impressive rocketry display on the plaza, the museum includes the Clyde W. Tombaugh IMAX theatre and planetarium, the International Space Hall of Fame, exhibits on the history of space flight, and memorabilia from NASA and White Sands Missile Range.
AAC president David Wright is at the eyepiece of the Buena Vista Cave telescope.

New Mexico has some of the most stringent lighting ordinances in the country. Having nearby observatories like Apache Point and several NASA adjuncts, Alamogordo has local ordinances that require full cut-off lighting fixtures for all new installations, and the use of mercury vapor luminaries is prohibited. Many older fixtures have been grandfathered in, but they cannot be replaced without meeting current standards. The net result is that light pollution is not bad for a city this size, and it will continue to improve.

A rich history in the space sciences and an association with surrounding observatories, plus the town’s strict lighting ordinances, make Alamogordo a natural area for amateur astronomy. Such nearby facilities as White Sands and several state parks mean that observers need not travel far to find even darker skies. The AAC provides a focus where astronomers from town and the nearby mountains can gather to discuss astronomy and their individual projects and learn from one another. The members are very friendly. It is a fun group.

The southern Milky Way arcs through Sagittarius above the author’s Makalii observatory, which is illuminated by a crescent Moon to the west. Thirty-second exposure at ISO 400, Pentax *isD, 50 mm f/2.0 lens. Except as noted, all photos are by the author.

Rainbow over Victoria Falls, Zambia. Photograph by Father Brown.

Three giraffes at sunrise. Mala Mala Game Reserve, South Africa. Photograph by Father Brown.
Plans for Cherry Grove Observatory

NOTE: OBSERVATORY IS A UNHEATED, UNINSULATED STRUCTURE

NOTE: VERIFY WINDOW & DOOR R.O.

BEAM OFFSET 3/4" TO ALLOW RAIL TO REMAIN CENTERED ON BEAM

ANGLE IRON RAIL CENTER

ROLL-OFF ROOF SUPPORT BEAMS

FLORAL POLYDOME SHELTERS

1/2" CDX EXTERIOR SHEATHING

LPI "SMARTSIDE" LAP SIDING

2 X 6 SPF STUDS (16" O.C.)

1/2" CDX EXTERIOR SHEATHING

LPI "SMARTSIDE" LAP SIDING

2 X 4 SPF STUDS (16" O.C.)

22'-0" 12'-0" ROOF TRUSS @ 24" O.C.

4'-8" x 6'-8" STEEL DOOR R.O. 4'-9" X 6'-9 1/2"

3'-0" x 6'-8" STEEL DOOR R.O. 3'-2" X 6'-9 1/2"

15'-6" 4 1/2"
Candidates for MAS Board

Dave Falkner, candidate for president

I first became interested in astronomy as a pre-teen when my father took me to a show at the Holcolm Planetarium in Indianapolis. I became hooked and have had an interest in astronomy ever since. As a teenager I ground a 6” mirror and built my first telescope. As a naval officer stationed in Monterey, California, I was involved with the Friends of MIRA (Monterey Institute for Research in Astronomy), where we conducted outreach to local schools associated with the return of Halley’s Comet.

My involvement in astronomy has ebbed and flowed over the years, but after retiring from the navy I rekindled my love of astronomy a few years ago when I joined MAS. Since then I have been very active, attending every major event including CWTS, NNSF, Messier Marathons and the 4M, and Spring and Fall Astronomy Days. I often give a presentation on some aspect of astronomy at these events.

Greg Haubrich, candidate for board member at large

MAS Activity: Active MAS member since 1995. Current MAS Astronomical League ALCOR. Current MAS Astronomical League award coordinator. Former member of BAD Telescope Committee. First suggested MAS purchase a very large Dobsonian telescope; followed through on committee which purchased the 24” Starmaster. Chaired the MAS Dark Sky Site Committee. Was instrumental in securing LLCC as an MAS Dark Sky Observing Site. Former MAS board member at large in 2004. Proposed forming rules governing MAS committees (in place). Was involved in helping to facilitate the upgrade of the Larson telescope at Onan. Made initial MAS contact with Belwin and handed off to the following board.

Scott Anderson, candidate for board member at large

I live in Lakeland, which is in the far eastern suburbs of the Twin Cities near the Wisconsin border, or about a ten-minute drive from the Belwin/Metcalf/Casby observing site in Afton. I am an advanced chemist at 3M in the health care business sector (infection prevention division) and have been working there for over 31 years. I have been a MAS member for over five years and have attended most meetings during that time. I also try to attend several star parties during the year. I really enjoy the star parties that MAS regularly organizes at several observing sites, such as Cherry Grove for the mini and full Messier Marathons as well as LLCC. Although I have never attended a star party at Onan, I am excited for the opportunity to visit there and become more involved with the organization.

My interest in astronomy has been life-long, beginning in my pre-teen years in the late ‘60s and early ‘70s, when I observed the Perseids meteor shower with my father. An open field near Stillwater ignited my interest in this field of science. Shortly thereafter I received my first telescope, a rather inexpensive 2” refracting scope from Sears with several eyepieces and solar attachments. After two decades of observing inactivity, I finally got started again when I heard from a friend at 3M about the Minnesota Astronomical Society. I then purchased a used Celestron 5” GoTo Schmidt/Cassegrain scope which I currently use for observing.

Astronomy is one of the few sciences where ordinary citizens can actively take part, and where equipment quality and sophistication has improved so much over the years that anyone at just about any age can get involved in making and recording observations. But what inspires me about astronomy is its easy ability to get anyone, young or old, to ask questions about what’s out there, about the nature that surrounds us, and a little bit about ourselves.

Thank you for your vote and this opportunity to support MAS by becoming a board member at large.
Roxanne Kuerschner, candidate for secretary

I am a teacher at Waconia High School, enjoying my 14th year of teaching at WHS. Although I usually teach both math and science, this year I am teaching 10th-grade biology, forensics and astronomy. I try to teach my astronomy students to appreciate not only all we currently know about the universe but what it took to get us to where we are today. I don’t know specifically how I became interested in astronomy. I just know I always enjoyed looking up at the sky out in the country where I grew up and just being enthralled with it. The Milky Way, the stars, the Moon, the constellations — all of those things just fascinated me. The high school I attended did not have an astronomy course, but I took some college courses and thoroughly enjoyed them. When my school was looking to expand our science curriculum, I offered to design and teach a couple of astronomy courses. The proposal was accepted and it has been a great trip ever since.

I have been secretary for the past two years, and it has been so amazing to be able to see how the organization works. This is such an exciting time, with all the changes happening at two of the sites. I hope to be able to continue with helping out the organization at that level.

I have been a member of MAS since 2005 and a keyholder since 2006. The public nights are my favorite part of being a keyholder. Being able to show people the great delights in the sky and hear them say “Wow!” makes it all worthwhile. Although I think it is interesting to see how many people have been out to Onan many times, I like talking to the ones who are making their first visit and finding out what their astronomical interests are. My interest in astronomy is all over the place, from the history and cultural aspects of the constellations to observing the night sky and exploring the future of research.

When I am not teaching I am taking care of my children and of our new puppy, Jack, and coaching the Waconia Girls Rugby Club, just in its fourth year of existence. I also am the advisor of the Robotics Club.

MAS president David Falkner, David Olmstead and Mark Job discuss the construction of the new classroom at Onan.

David Olmstead and David Falkner look over the construction of the Sylvia A. Cashby Observatory at Onan.

Plans for the new classroom at Onan

Every attempt has been made to assure the accuracy of these plans. Because of the chance for human error or changes in the field, all dimensions, materials & elevations should be verified. The contractor is held all errors & conditions in the field is no responsible for same.

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MAS offers a patron membership to those members who wish to contribute a little extra to help support MAS activities. Patron memberships are established by constitution at 2-1/2 times the regular membership rate — currently $70 annually for a patron membership. The $42 additional contribution is tax-deductible. It is used to fund equipment acquisitions, facility improvements, further outreach activities and more. We would like to thank the following patron members as of November 11.

Tom Alm
Scott Anderson
William Arden
Pat Arndt
Jack Atkins
Rajib Bahar
Steve Baranski
Greg Baril
Bradley Beisel
Ken Bolvin
Rev. Eugene Brown
Jonathan Burkhardt
Jeff Burrows
William Bynum
Ken Carlson
Scot Carpenter
Kurt Casby
Joseph Chiodin
Deane Clark
Paul Coffey
Michael Conley
Mark Connolly
Mike Daniels
Alex Danzberger
Paul Davis
Shawn Davis
Courtney Dietzmann
John Donohue
Jim Elquist
Steven Emert
Dennis Faith
David Falkner
Al Ferber
Joe Fisher
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Cindy Funk
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Gale Jallen
Mark Job
Chelen Johnson
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Geoffrey Stone
David Swymeler
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Paul Walker
Greg Welch
Mark Wicklund
Brian Wray
Neal Zimmerman

MAS Board Minutes for September and October
by Roxanne Kuerschner, secretary

September

Cherry Grove: Ideas are circulating about how to fix the roof issues. Sylvia Casby Observatory and classroom: The Hot Spot is the name; excavation starts this Monday, September 24.

Onan Observatory: It has been an Onan Committee recommendation that permanent piers be put in at Onan. It will be a better product, but can it be done? Should we sell the tripods to cover the cost? Dave will contact Merle about the feasibility of it.

Fall Astronomy Day, October 20: Speakers are lined up.

Status of 2011 taxes: Taxes are done. The year 2012 will be different because of the donations, so Chris will check to see if the taxes are more or if there is more paperwork required.

Election coordinator: Mark Job will do it.

Orion 6" XT scope case: Clayton authorized $100 for a carry case and other necessities.

Outreach forums: For security purposes, it should be restricted to a specific group, maybe key holders only. The wording will be changed to include the outreach e-mail for anyone else to contact. Clayton will check on it to see how to keep it non-public. Appreciation and recognition: The board is looking into ways to recognize some of our super volunteers for their service. Everyone’s Universe: a Guide to Accessible Astronomy Places (second edition): We are in it again. We need to get in the 100 Cool Things in Minnesota book. Dave will contact the author to get it in next time. Members’ astro photos: With the skill level of our members’ astrophotography, should we highlight that somehow? Mark Job will look into options.

LLCC: There was discussion on the forums about modifying the 30" for use for photography. The LLCC Committee will take care of that.

CGO: Mark will get a quote from his electrician about the job.

Account at Menards: To make it easier for paperwork and receipts, we will get an account to use at Onan.

Web team: The team needs to get moving on decisions regarding the progress of the website.

October

Cherry Grove Observatory Update: Vic was at the meeting to provide an update on expenses, roof design, and the estimated time to complete the project. Time was lost due to the roof. A work party on Saturday will do the roof. An electrician is still being researched. The decision is to sell the 14" and 10" Meades and keep the 12" for a second scope. A shorter tripod will not be needed for the 14". Sylvia Casby Observatory and classroom: We are still waiting for concrete footings and block work to begin. Merle has hired the contractor.

Fall Astronomy Day October 20: Chris will pick up an eyepiece and a set of binoculars.

Election preparation: Mark will send an e-mail via the list serve and post on the forums.

Special recognition: The board will periodically recognize outstanding members for volunteer service.

Web redesign: The team will have a working place for mock-ups and will select a system to manage the content.

Postcards at Onan: Mark will work on designing and pricing postcards to use at Onan in the spring of 2013 with important dates, etc. Forum Security: Forums need to be more secure, especially outreach. Russ and Clayton will work on it. Ric will moderate the outreach forums.

Cashy Thank You letter: This was completed.

Observing Chair replacement: Bill Kocken has submitted his resignation. We will need someone to take charge of the Messier Marathon and Virgo Venture, and we will need an Observing SIG forum moderator.

Request for payment to Clear Sky Clock: The board decided this was not an acceptable substitution, as it would make deciding what would substitute very difficult.

Acceptance of donation of Coronado SolarMax II 60 for installation at JJ Cashy Observatory: Clayton moved, Chris seconded; motion unanimously approved.

Astronomy Magazine subscriptions for MAS members: This will be looked into.

Beginners SIG replacement for Steve: Dave will go it alone for awhile but will silently search for a replacement.
Fall Astronomy Day Activities at Onan Saturday, October 20

By Merle Hiltner

2:00 Cloud cover prevented solar observing and daytime viewing of the Moon, Venus or Mars. There were, however, tours of observatory and activities and crafts for kids.

3:00 Speaker: MAS president Dave Falkner
Topic: “The Search for Extraterrestrial Life”
Dave talked about humankind’s fascination with life beyond Earth and explored the likelihood of finding life in our solar system and around nearby stars.

4:00 Speaker: Bill Arden
Topic: “Fall and Winter Sky”
Guests learned of the fall and winter constellations that include some of the best things to see in the night sky, as well as their history and mythology.

5:00 Dinner Break

6:30 Speaker: Jake Hairrell
Topic: “Graveyard Astronomy: The Death of Stars”
From small to big, all stars have finite life spans. Some die quietly and leave us with breathtaking remnants of their death processes. Others die more spectacularly, and their corpses can be so strange that they continue to mystify those who study them. In this talk Jake explored the stellar graveyard and revealed some of the mysteries in it.

7:30 Door Prize Drawings: The door prize winner was Karen Kluberud from North Dakota. Karen became the grand prize winner when MAS member Bill Wood, who already has a telescope, declined the prize and allowed Karen’s name to be drawn.

8:00 Ron Schmit gave a tour of the constellations as thin clouds began moving in. MAS members and guests continued viewing until nearly 9:30, when the clouds completely obscured the sky.

The skies cleared just after sunset and permitted us to get a good variety of objects observed. While the evening was cut short by cloud cover, I would say it was a very successful day.

Thanks to the speakers for the day, MAS President Dave Falkner, Bill Arden, Jake Hairrell and Ron Schmit for the entertaining and informative talks. Special thanks to the many keyholders who helped get the observatory ready for the day, man the scopes and generally entertain the public throughout.

Merle Hiltner, Onan Committee chair

Photographs by Merle Hiltner and Father Brown
Your MAS membership expires at the beginning of the month shown on your Gemini mailing label. Send your payments to the MAS Membership Coordinator at: Minnesota Astronomical Society, Attn: Membership Coordinator, P.O. Box 14931, Minneapolis, MN 55414. Make checks payable to MAS or you can pay by PayPal on the MAS web page. The current annual membership dues and subscription fees are: $28 for regular membership ($60.95 including a Sky and Telescope subscription discounted to the annual member subscription rate of $32.95); $70 for patron membership ($102.95 including Sky and Telescope subscription); $14 for student membership ($46.95 including Sky and Telescope subscription).

New subscriptions to Sky and Telescope at the MAS member discount must be sent to the MAS for group membership subscription processing. Send new subscriptions with your MAS membership to the attention of the Membership Coordinator at the MAS at the Post Office box address shown on the back cover of the Gemini newsletter.

You may mail your subsequent subscription renewal with payment directly to S&T or renew via phone with Sky Publishing at 1-800-253-0245. This method is especially beneficial to those who wait until your subscription is about to expire before renewing S&T. If you wish, you may still submit your S&T subscription renewal to the MAS when you renew your membership in the MAS and we will enter your renewal on your behalf just as we always have done.

You will still need to send in your MAS membership renewal to the MAS Membership Coordinator at the MAS Post Office box address or renew your membership via PayPal.

The MAS uses web Discussion Forums and e-mail distribution lists for timely communications. We highly recommend you subscribe to the MAS general distribution email list.

To subscribe to the MAS e-mail list visit: http://lists.mnastro.org/mnastro/listinfo/ and follow the subscription instructions.

There is a general list (MAS), several Special Interest Group (SIG) lists and other lists for special purposes. Archives of the lists are also available by visiting the listinfo page for a specific list.