

The High Desert Observer

The Bulletin of the Astronomical Society of Las Cruces

January, 2009



President's Message

It's a new year and a new group of officers have the honor of serving our society. I am very grateful for this opportunity. I would like to thank the outgoing officers for the great job they did managing the society last year. We had an eventful year with many successful accomplishments. We finally have ASLC shirts and caps to wear at our many public outreach events. We approved and started the effort towards a public outreach club observatory. We still have a long way to go on that and with luck and hard work we may see it completed this year. We co-hosted the White Sands Star Party, we had a great Ren Fair and we took astronomy to many of our local schools. We saw several new members join and participate in our events and we saw some of our long term but silent members return to active participation.

We had another great award winning year for our *HDO* and our website. We have seen our members move forward and produce both great science and great images. All in all we have truly had a great year. I only hope I can help lead us through yet another amazing year.

It's 2009 and time for us to move forward into the International Year of Astronomy. What a great time to be an amateur astronomer. It's hard to believe that only 400 years ago the first telescope was pointed to the sky and the world of astronomy took a giant leap forward. This year will bring much attention to our hobby and our passion. We need to be ready to help enlighten and educate and amaze those that will have their interest awakened by the publicity generated during this special year.

We already have a great start with the new telescope user's clinic, moon gazes with record turnouts, and star parties being requested. As usual, the requests are being responded to by our dedicated members. We can always use more help as this year should be a record year for public outreach. Lets all pitch in and support it, lets not let our, always there, core group of public outreach supporters get burned out. This will be a challenging year with all the events and the planned observatory hopefully being built.

We live in or close to one of the last great dark sky areas of the country. Let's actively help keep it that way. Increased population does not mean we need to lose our pristine skies. We need to help educate the city and local residents about the value of this rare natural resource and help them understand what they can do to save it. I am looking forward to a great year.

Your president and humble servant,

Jerry Gaber

The Astronomical Society of Las Cruces (ASLC) is dedicated to expanding members and 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 per year. Those opting to receive the ASLC newsletter electronically, receive a \$5 membership discount. Send dues, payable to ASLC with an application form or a note to: Treasurer ASLC, PO Box 921, Las Cruces, NM 88004.

ASLC members are entitled to a \$10 discount on subscriptions to *Sky and Telescope* magazine.

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Next Meeting

The next monthly meeting will be held January 23rd at 7:30 pm in the usual place (Main Campus of the Dona Ana Community College, room 77). The speaker will be Ann Owen. The topic will be Archaeoastronomy, See the following page for details.

The imagers' group will meet at 7:00 pm.

Events

The next monthly dark sky viewing night will be held on Saturday, January 24th at the Upham site. In addition, a MoonGaze will be held at the International Delights Cafe on Saturday, January 29th. For these and other events, please see the ASLC website for further information:

<http://www.aslc-nm.org>.

February Issue of the *HDO*

Articles for the February issue should be sent to Tony Gondola by January 10th. Text should be sent as email (acgna@comcast.net) or as an attached Microsoft Word document. Images should be sent in jpg format.

If you have any questions about submitting materials for publication in the *HDO*, please don't hesitate to contact me at 571-5118 or via email. Thanks in advance! Tony Gondola, Editor, ASLC Newsletter

Sky Watchers of Adobe Canyon

By

E. Ann Owen

During the past three years, I have conducted archaeoastronomy research at the Gila Cliff Dwellings National Monument. Adobe Canyon is a small NE/SW facing canyon that empties into the Gila River about a mile below Cliff Dweller Canyon. The mouth of the canyon is marked by a number of pictographs, which include; negative handprints, deer or quadrupeds, a crescent moon, and a rectangular box. These pictographs



are placed strategically around the mouth of the canyon to provide sun and moon watching stations. The canyon provides a natural calendar, which marks the rising summer solstice sun and the winter solstice sunset. During the past year, I have been documenting the entire sequence of rising and setting full moons, as well as rising and setting suns. Sun watching is known to be an important part of Southwestern Pueblo Indian activities. These sun-watching practices have been well documented in Chaco Canyon, but the nature and extent of these activities among the Mogollon have not been thoroughly researched until now.

Ann Owen will be the featured speaker for the January ASLC meeting

For those of you who might be wondering what happened to minutes for the last meeting, do not fear. As has been the habit of the society over the last few years, the regular December meeting was replaced by the ASLC Christmas party. Since this is not a formal meeting, minutes were not taken. For those of you who enjoy reading such official accounts (and you know who you are), they will return with all the usual thrills and spills in the next issue. - Ed.

Imaging with Robotic Telescopes

By Tony Gondola

It's amazing how technology can sneak up on you. It wasn't that long ago that the idea of controlling a world class imaging telescope located halfway around the world, from the comfort of your home, would have seemed like a pipe dream. However, today's advances in software, hardware and especially the widespread use and availability of broadband Internet services have changed all that. There are now a number of remote robotic observatories that are available for public use and many more in private hands. In this article I'm going to cover the pros and cons of this type of imaging and outline my experiences over the last year with two very different robotic, public use systems.



*GRAS system 12.5" RC Cassegrain
located in Moorook, Australia*

The first question you might well ask is "Just what is a robotic telescope?" You might think you already own such a beast and that this is nothing new; you have GoTo after all. Well, that's part of the system but, in reality, it's just the beginning. A true remote robotic system has to be capable of operating completely on its own, in a remote location, for days, weeks or even months at a time without direct human "hands on" intervention. The only control is via commands sent over the Internet. When you consider all the things that have to happen correctly in order to produce useful imaging data, you quickly realize what a wonder this really is.

Before I get into the details of using actual systems, let's take a look at the advantages and disadvantages of imaging this way.

On the plus side, with the right system you can have access to a large number of high quality imaging telescopes ranging from small wide-field APO refractors to large astrographic RC reflecting systems. Along with that you'll have the opportunity to use a number of different cameras and generally will have a large array of imaging filters at your disposal. All of that will be carried on first class mountings with high tracking accuracy, guided or unguided. This gives you both the flexibility to match the camera and telescope to the target and also to test drive a much wider array of hardware than most of us would normally have access to.

Another big advantage is that some services have telescopes that are based in different parts of the world. Using telescopes in Australia, for instance, allows users in the US to image during the morning and early afternoon hours, as well as giving access to all those wonderful southern hemisphere objects. In the evening you can access the US-based scopes for work throughout the night. This kind of flexibility is very useful. The telescopes are usually located in areas that offer very dark sky conditions. That's another time saver because you can get great data with relatively short integration times. This sort of flexibility gives you the freedom to become very selective about imaging conditions and choose the optimum time to image specific targets. If the seeing is bad or transparency drops you can just log off and do something else. Contrast that against the usual game of driving to a dark site and then taking whatever conditions you get because it's taken so much effort to get there and set everything up. It's very hard to say no to imaging at that point.

The last positive points to consider are cost and commitment. Let's face it, building a small home observatory outfitted with the latest in optics and hardware can be financially out of reach for many. Robotic observatories allow you to pay as you go. If you're a beginner and not sure that you'll enjoy imaging and processing enough to justify the cost of your own setup, using a robotic observatory is a great way to get your feet wet and try it out.

No doubt there's a lot of positive things that can be said about robotic imaging but what about the downside? We've just mentioned cost as a positive but it can be a negative as well. While robotic imaging is relatively inexpensive when compared to the cost of building a first class observatory, it's rather expensive when compared to a more modest, portable imaging setup. The clock on available credits is always counting down, so you really have to be as efficient as possible to get the most out of your investment. This can sometimes lead you to imaging shortcuts such as reducing integration times, which in turn, can compromise the final data.

Another negative factor that I felt rather strongly was simply the lack of "hands on" control. You have to work within the constraints of the given telescope setup. Most of the time that's just fine but there will be times when it will feel rather limiting. There's also the nagging feeling that you didn't create the image in the same sense as someone who goes through all the time and effort to image in the traditional way. The well-deserved pride that comes from doing it all on your own, from the ground up, just isn't there.

Lastly there is the issue of reliability and the particular way this affects a remote installation. These are complicated systems so glitches do happen. While a lot can be done via remote commands and resets there usually isn't anyone there to dust off a dirty filter or adjust collimation. Problems like these seem to be the most common and can sometimes take days to resolve. Happily, most services will refund your scope time if such problems result in bad data, but unless the problem is very obvious it will be up to you to prove the case. It pays to look closely at the last image taken with the scope you want to use (if possible) to make sure that everything is working properly-before you take control.

Ok, so much for the pros and cons. Let's take a look at some actual services in detail.

Global Rent-a-Scope (GRAS)

The GRAS network currently offers twelve telescopes ranging in aperture from 3.5" to 12.5". Six of the telescopes are located in Moorook, South Australia, and the balance are in nearby Mayhill, New Mexico. Both are excellent dark sky sites and the Moorook station often has very good seeing. Most of the telescopes are outfitted with SBIG cameras of various types ranging from the ST8 to the STL11000. Each telescope has a set of user selectable filters, depending upon the scope's intended use. Some instruments have the standard photometric UBVRI sets while other instruments that are intended for non-scientific imaging feature the standard LRGB sets. A few sets also include Ha, S2 and O3 so the range is covered very well.

Image calibration files are produced by the GRAS operators on a regular basis for each telescope. They also maintain an archive of older calibration files in case you need to go back and reprocess an old image. The file sets usually include dark, flat and bias frames, covering all the available filters for that scope and all possible binning modes.

Using GRAS is very much a "hands on" operation. Once you've logged in and checked conditions you select an available telescope and log into its setup and control page. From there you select your target, filters, exposure times, focus and guiding options. When the run is submitting, you are switched to the control page where you can watch the progress of your imaging run and see a quick auto-processed image of your last exposure. You can abort the imaging run at any point, which is a great option to cover unforeseen errors and events that happen during a run.

You can also log onto a telescope that's already in use and watch another imager's run in progress. You can't take control in this mode so it's a great way to learn how the system works before you go solo.

Observatory	Telescope	Imager	Activity
In use	Slew 0.0°	Shutter Closed	Imaging
UTC: 02:17:28	RA: 05:41:25.59	Filter Clear	Target ic434
LST: 02:54:03	Dec: -02°27'59.5"	Binning 2:1	
Local: 19:17:28	Az: 124.7°	Cooler -10°C/26%	
Date: 14-01-09	Alt: 35.9°	Guider	
Owner Jean-Marc Darchy	Air: 1.7	Idle	
Weather Clear Wind	RA/Dec local topo	Error Ex: ---	
<i>Hover mouse over links</i>		Ey: ---	

 **Abort Script**

Current Running Script Output:

```
(using Clear filter for pointing exposure)
(taking 20 sec. exposure, Clear filter, binning = 2)
(start image download...)
Calibrating image...
FITS File Saved
Saved FITS Header Keys
Plate-solve pointing image.
153 image stars found
Trying to plate solve last exposure...
Plate Solved! 57 stars matched.
Average residual is 0.87 arcsec.
Pointing error is 2.337 arcmin @ angle 358.01
True focal length is 84.2 cm.
True image center (J2000): 05h 40m 59.6s -02° 24' 39.84"
Imager sky position angle is 359.5 deg.
Internal guider, always re-slew
Re-slew to target.
Start slew to ic434...
(wait for slew to complete)
```

Main section of the GRAS telescope control page showing current status and script running.

Once your run is complete all of your raw data is transferred to a public or private FTP page for download. Depending upon Internet conditions, getting your data can take anywhere from a few minutes to a few hours. Both scripts and reservations are supported so it's possible to setup, in detail, an imaging run for a specific scope and time. If you need time specific data, the system can support it.

GRAS is a subscription service that has a number of levels and options. Basically, you buy points that are good for a specific amount of imaging time. The actual amount of time that you get depends upon the plan and the scope selected. Cost is a dollar per point, telescope time ranges from 26 to 95 points per hour depending upon your selected subscription plan and telescope. In addition to the regular subscription, you can sign up for a free test drive which gives you a total of 60 minutes of time on a TAK Sky90 refractor and single-shot color, DSLR imager. As a step up from that you can also buy a trial subscription for \$49.95 that will give you 50 points (0.7 to 1.2 hours depending upon the telescope.)



M8 imaged with GRAS-008

From GRAS we'll now take a look at the Sierra Stars Observatory Network. Currently this system consists of only two telescopes but what great scopes they are. The primary scope is a 24" (0.6 meter) F/10, RC cassegrain made by Optical Mechanics. This scope is located at the south end of the Carson Valley in Alpine County California about two miles from the Nevada state line, an excellent dark sky site. The imaging system is based on a Finger Lakes ProLine 3056x3056 monochrome CCD camera, sporting a BVRI filter set. Because of the large format of this camera and the relatively long effective focal length of the system (21' x 21' at 0.4" per pixel), all images are taken in 2x2 binning mode. On most nights there's not much resolution lost and it really boosts the sensitivity of the imager. The other scope in the system is a 14.5" F/14 Optical Mechanics DK cassegrain. This telescope, which is located 50 miles southeast of Tucson, Arizona, uses the same FLI camera as the 24" scope. The filter set is a bit different offering RGB Ha and clear.



M27 imaged with the 24" SSON telescope

As much as the GRAS system is hands on, the SSO system is hands off. Once imaging runs are built and submitted using the on-line interface they go into the imaging cue and are executed for you at the first opportunity. Once the data is created, the SSON staff applies the needed calibration files and checks on the quality of the data. Once the calibrated images are ready you simply download them from the SSON website.

On the billing side, because you're never directly in control of a telescope you pay only for actual imaging time. Again, it's a points-based system charged at one dollar per credit with a minimum purchase of points. The 24" scope is charged at a rate of 100 points per hour, the 14.5" costs 50 points per hour. Both rates are based on actual imaging time only. For first time users there's a one time introductory rate of 83 points for \$50.00.

To close, I hope this short overview will stimulate some interest in robotic telescope services. While not the answer for everyone, I believe they can play an important primary or supplementary role for both the beginning and experienced imager alike.



NGC 5139 with the SSON 24" DK Cass.

Global rent-a-scope website: <http://www.global-rent-a-scope.com>

Sierra Stars Observatory Network website: <http://www.sierrastars.com/Default.aspx>

NJP vs G11, IMHO

By George Hatfield

I certainly don't claim to be an expert when it comes to astronomical mounts. However, in the last few months I have used both the Losmandy G11 Gemini mount and the Takahashi NJP Temma II. I've owned an NJP for some time, but purchased a G11 with the idea of using it as my portable mount for imaging away from the observatory in darker sky areas. I used the G11 as my primary mount last fall. The NJP and G11 are both equatorial mounts that are used frequently by astro-imagers. What follows is a brief review of some of the features I liked and disliked about these two mounts.

First, the similarities... Both have similar instrument weight capacity (G11 60 lbs, NJP 65 lbs); both are GoTo mounts; both are fairly heavy (G11 36 lbs, NJP 50 lbs); both have the capacity to be guided; and both have relatively low periodic error (more on periodic error below).

As far as differences go, certainly the price is different. The Losmandy with Gemini goto retails for about \$3200 (without tripod), but it can be found used for about \$2200. One good thing about the G11 is that there are a lot of these mounts out there and they can frequently be found on Astromart where I found my G11.

On the other hand, the NJP costs more than twice as much, with a retail price of \$7555. The fall in the dollar value versus the Japanese yen will continue to drive this price up. These mounts have been available on the used market, but much less frequently than the G11s. The used price is usually around \$4000. I also purchased my used NJP through Astromart.

So what do you get in the NJP that justifies this difference in cost? One of the advantages of the NJP is its built-in tracking accuracy. Takahashi claims a tracking error of 4 arcsec. I measured the PE of my NJP in 2007 using PEAS software (http://www.grecner.cz/astro/peas_a.htm) and found it to be about 5 arcsec peak to peak. Unlike the G11, the NJP mount does not have any electronic periodic error correction (PEC), but given its innate accuracy, there is little need for it.

On the other hand, the G11 can have a maximum periodic error of 20 arcsec or more. But with PEC it is possible to cut that error down to 5 arcsec or less. PEC can be a pain to define manually, but with PemPro software (<http://www.ccdware.com/products/pempro>), it's fairly easy to do. So in the end, the PE is close for both mounts. Another way to reduce PE of the G11 is to buy better quality worm gears from Losmandy. The G11 I owned had one of these gears in the RA drive and the PE is around 5 arcsec without PEC.

Low PE in the G11 requires optimal worm gear adjustment. One of the big differences between the two mounts, at least for me, is the fact that the NJP worm gears require little or no attention. I have owned an NJP for about 1.5 years and I have never touched them. That is in contrast to the worms on the G11 which required attention several times in the few months that I used it. The fit of the worm to the worm wheel (aka worm gear) is critical. If it is too loose, there is too much backlash in the system and guiding will suffer. If it is too tight, the gear will bind and that causes errors in slewing and guiding.

I much prefer the “no fuss” arrangement in the NJP. There is an upgraded gear for the G11 which promises much lower PE and easier worm adjustment. The after-market gear is made by Ovision and was reviewed on Astromart (http://www.astromart.com/articles/article.asp?article_id=663). Another feature of the NJP that I really like is the setup of the goto system. Takahashi has a hand control box available (at extra cost) with numerous programmed targets, but I have not used it. The Temma II goto system normally operates off a PC using software called Telescope Tracer 2000a. To calibrate the mount with the celestial sphere, you simply place the mount in a horizontal position with the weights pointed east. This is easy to do accurately with a small level. Then the DEC axis is adjusted such that the telescope is pointed straight up (i.e., at the Zenith). Again, this is easy to do with a level. Once in that position, you just turn on the mount and initialize the software. The final step is to align the scope with some star... any star! Telescope Tracer is a planetarium program and any star shown can be used for alignment. It's very easy to pick a star—just “point and shoot” so to speak. Once that is done the mount is ready for goto. “The Sky” software can also be used to control the mount gotos following initialization. You just turn off the Tracer software and connect “The Sky.” Of course if you cross the meridian, an additional synch is needed to ensure accuracy. Normally when I'm imaging, I do an additional synch on a star near the target. The goto feature of the NJP, at least in my experience, works flawlessly.

In contrast, the start up position of the G11 is with the counterweight shaft pointing straight down. There is no easy way of ensuring that it is exactly in the correct position, but this is not a big deal since the mount is synced with one or more alignment stars specified by Gemini. There is an extensive list of alignment stars (49) in the hand controller that one can use, but it is still a finite list and I prefer the planetarium format and flexibility of the Temma II system. The G11 goto system can be operated entirely from the hand controller, which is a nice feature, especially for non-observatory operation. In my experience, the Gemini goto system worked quite well, but it was not as accurate or reliable as the NJP. For example, on occasion it would seem to lose its bearings and go in the wrong direction for the selected alignment star. This only occurred with the first goto for alignment. Once it is aligned, the G11 can also be operated using “The Sky” software.

The hand controller for moving the mount in the RA and DEC axis is less than ideal for both mounts. Since the G11 Gemini controller provides a lot of features in addition to just movement, it's more complicated to use. The feature I never did get used to was shifting between speeds. For example, if you want to move in +RA, you control the speed of the movement with the RA button. I found this to be a pain to use and often overshot my intended target. The mount was either moving too slow or too fast.

The hand controller for the NJP basically just controls movement so it's much simpler to use. There are only two speeds (slewing and sidereal) which are selected by a toggle switch on the hand controller. One disadvantage of this system is that if the switch is left on the fast position, the mount will try to guide at slewing speed! This is especially a problem when calibrating the mount for guiding. I don't know how many times I have had to re-sync the mount after having it go off into the ether somewhere while trying to calibrate at slewing speed.

Anyone involved in astrophotography will agree that polar alignment of the mount is critical. That is, the RA axis of the mount must be very close (say +/- 2 arcmin) to the rotational axis of the Earth. Both mounts have polar alignment scopes that look up the RA axis. Both provide a reticle image that aids in alignment. In my hands, the Losmandy system works much better than the NJP. With the Losmandy, you simply adjust the elevation and azimuth of the mount such that Polaris and one or two other stars in the area align with the reticle. On the other hand, the NJP requires that you know local sidereal time (LST). The RA position of Polaris is then subtracted from the LST and Polaris is placed on a clock-like reticle for that position. In my hands, the Losmandy system is much easier and more accurate. Thankfully, PemPro software provides an easy way to optimize the alignment for both mounts.

Another big difference between the two mounts is the documentation provided by the two companies. The manual for Gemini is 137 pages long! The one for Temma II is 27 pages. Fortunately, the simplicity of the NJP compensates a bit for the relative lack of documentation. When I have a need for more information on the NJP (e.g., how the guide cable is wired), I usually turn to Google or the TAK Yahoo users group.

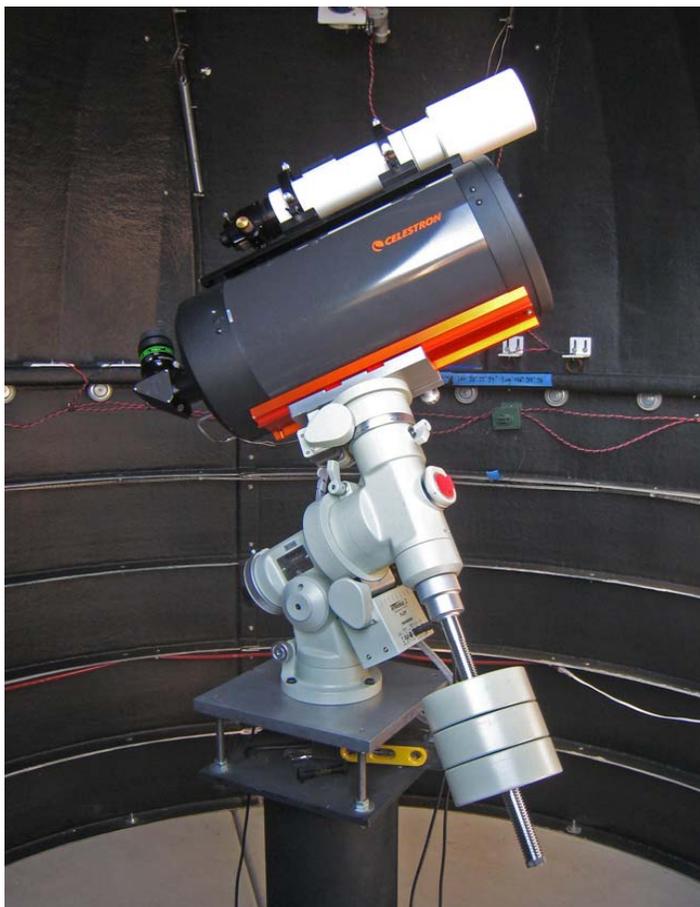
In summary, yes, IMHO the NJP is a better mount. It is easier to use, less temperamental in my hands and overall, provides better images. But is it worth twice the cost? For me it is, but for those who are more adept mechanically, the G11 might be the preferable alternative. There are certainly a lot more G11 owners in ASLC, and you could say that ownership is the ultimate endorsement.

I recently sold my G11 to another member of ASLC. I came to realize that trips to dark sky areas were going to be few and far between, and the complexity of using any mount for imaging requires a lot of practice. So I'm going to focus on the NJP and remove it from the observatory when I do get a chance to image elsewhere.

Other reviews of these mounts can be found on these websites:

NJP: http://www.astromart.com/articles/article.asp?article_id=309

G11: <http://www.observatorycentral.com/index.php?showtopic=173&mode=threaded>



Takahashi NJP mount with Celestron 9.25 and Borg 101ED



Losmandy G11 mount with Celestron 9.25 and imaging setup

Perigee Moon 2009



On January 10th the largest moon of the year rose majestically from behind the pinnacles of the Organ Mountains. The lunar orb was 14% wider and 30% brighter than at some times of year, due to its position in the elliptical path it follows around the Earth. The point of closest approach, called perigee, is about 50,000 kilometers closer to Earth than the point of greatest separation (apogee.) Perigee full Moons usually occur once or twice a year.

This image was taken with a 66mm refractor and Canon 300D DSLR mounted on a fixed tripod from near the village of Mesilla. I took a number of shots at different exposure settings during the event with a 1/1000 sec. exposure at ISO800 giving the best result. The image was processed in Photoshop by applying a light gaussian blur filter to the background sky to reduce noise and an unsharp mask filter to the moon to increase visual detail.

– Dave Dockery



*NGC 3372 imaged with the GRAS system 12.5" DK cassegrain from Moorook, Australia.
SBIG STL-11000M 3 frame mosaic - Tony Gondola*

NGC 7380



H alpha image from 20 x 5 min. exposures, binned 1:1 SBIG ST 10XME with AO8, Celestron 9.25" at F/4.9

-George Hatfield

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

