

Sierra Remote Observatories Newsletter

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Fun Link:

[Follow this link to our video page, which includes a drone overflight of SRO, as taken by Planewave while installing a 24" CDK \(while the new observatory was in early construction\).](#)

Visit us at:
<http://www.sierra-remote.com>

SRO: Our Site and Infrastructure

Sierra Remote Observatories (SRO) is a premier remote observing site dedicated to state-of-the-art robotic/remote astronomical data acquisition and imaging. We are uniquely located in a very accessible area of California's Sierra Nevada Mountains, about 50 miles South of Yosemite National Park. In addition to having excellent darkness and seeing conditions, SRO's location is unique since we are within an hour of a major metropolitan area and international airport, making access to the facility and to external support exceptionally easy.

At nearly 5000 feet, on top of Bald Mountain, the SRO site was chosen for its excellent seeing conditions as well as its ease of access. Summer intrinsic seeing FWHM measures 1.0 arc second with sky darkness running around 21.78 magnitudes/sq. arc



Sierra Remote Observatories

second V band, which is very dark for such close proximity to a major city. With an extremely low incidence of thunderstorm activity, no summer monsoons, maximum wind gusts averaging only 10 mph and an average of 237 photometric nights each year, Sierra Remote Observatories is a unique imaging location for imaging and data acquisition.

Since first light in May of 2007,

SRO has continuously operated multiple roll off roof observatories for both professional research and amateur imaging. There are 8 individual observatories which each house one or two telescopes and two larger observatories which each house up to 14 telescopes of various sizes, ranging from a

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In the Spotlight: ExoAnalytic Solutions

SRO is pleased to place ExoAnalytics in the Spotlight. Since taking residence at SRO in 2013, ExoAnalytic Solutions (www.exoanalytic.com) has built a global, robotic network of telescopes to provide 24/7 space situational awareness (SSA) to both government and commercial customers. The goal of this telescope network is to identify, correlate and track satellites, space debris and other near-Earth objects to assist in collision avoidance. Currently, the telescope network consists of over 70 unique sensors distributed between 14 sites in Australia, Africa, Europe and North America.

ExoAnalytic's telescope experience began when the

company's CEO, Doug Hendrix, took over his son's Christmas present and pointed it to the sky. At that instant, Doug serendipitously observed a low earth orbit (LEO) satellite passing through his FOV. Following this observation, Doug became motivated to create a telescope network to track near-Earth objects and ExoAnalytic has made large strides in the past 3 years to accomplish this goal. During the network's infancy, one of ExoAnalytic's first locations was in Building 9 at SRO, but quickly outgrew this location and moved to Building 3 in order to install more telescopes. Continually expanding the network is always at the forefront of the network's

operations. ExoAnalytic's telescope hosts range from individuals with a single telescope to professional multi-telescope hosting locations, such as SRO. Additional sites are already scheduled for South America, Australia and Europe in 2016, but ExoAnalytic is always looking for additional hosts. If you know of any potential interest please contact us at espoc@exoanalytic.com for more information.



Above: Sierra Remote Observatories: Building 9

*"What would Galileo have discovered if he had a PlaneWave CDK700?"
Mel Helm: April, 2016*

Some of SRO's most recent APODs:

NGC 2403 in Camelopardalis

By Eric Coles and Mel Helm
APOD: February 19, 2016



Star Streams and the Whale Galaxy

By R. Jay Gabany
APOD: December 19, 2015



NGC 7497: Galaxy, Stars, and Dust

By Eric Coles and Mel Helm
APOD: October 12, 2015



M51: The Whirlpool Galaxy

By Martin Pugh
APOD: May 2, 2015



Astrophotography Tips by R. Jay Gabany

Galactic Fossil Hunting

I consider myself to be very lucky because 1) my observatory is situated here at SRO- a location with world class seeing with an abundance of photometric nights- and 2) I have had the privilege to work with an international team of professional astronomers for the past ten years.

During my time assisting their research for the fossilized remnants of long lost satellite star systems surrounding spiral galaxies in the local volume, I have learned the following three requirements that have helped me identify never before seen stellar streams.

First, only collect observations under the best photometric conditions- when the seeing is steady with an average at or below 1.5 arcsec, the sky is moonless and absolutely cloud free.

Second, take extremely long exposures of at least five hours, with ten or more hours being more desirable. This requires patience because

these exposure lengths usually require multiple nights spanning weeks, months or years. Because there is a slight light dome extending from the south western horizon at SRO, I typically try to capture my data when the target is east of the meridian- where SRO skies are extremely black. Galaxies positioned south or west of the meridian are generally unaffected by the minute amount of sky glow at SRO if they are at least 45 degrees above the horizon.

Finally, and most importantly, take extra care when creating your flat frames because poor flats will leave grunge and other artifacts in the background of the sub-exposures. This unwanted noise will mask the presence of these incredibly faint stellar structures or confuse the edge of their boundaries, thus making the image scientifically useless. Over the years, I have found sky-flats to be the most reliable method of creating extremely flat image backgrounds. Fortunately, CCD AutoPilot can automatically create excellent sky flats by pointing the telescope at the dusk or

dawn null point on either side of the meridian. One other aspect about flats is essential: make sure the rotation angle of your sub-exposures is identical to the rotation angle of the flats you apply.

Obviously, there are more requirements to capture these elusive stellar fossils, but the three items I have mentioned are the most essential.

If you are interested in pursuing this type of quest, I suggest you first practice your skills by obtaining an image of a known stellar stream such as the multiple structures surrounding M63- the Sunflower galaxy.

If you have any questions or want more information, please do not hesitate to contact me anytime at rj2010@cosmotography.com.

Current SRO Members

Everyone from SRO is in contact through the Yahoo users group, but it's always great to see everyone's name in one list.

In the original 8 private observatories (building 1-8) we have
ExoAnalytic Solutions (Building 1),
Keith Quattrocchi (Building 2),
ExoAnalytic Solutions (Building 3),
Larry Van Vleet (Building 4),
Sandy Barnes (Building 5),
Geoff Stone (Building 6),
Dr. Fred Ringwald (Building 7),
R. Jay Gabany (Building 8).

In the multi-telescope building 9 we have:

Mike Miller (Pier 2),
Samuel Kong Yue Lising (Pier 3),
John Kasianowicz+Daniele Malleo+Leonardo Prazi+Rob Pfile+Rick Stevenson+Jerry Yesavage (Pier 4),
Paul Mortfield (Pier 5),
Dick Post (Pier 6),
Rick Hendrick (Pier 7),
Sofia/University of Stuttgart (Pier 8),
Steve Reilley (Pier 9),
Brad Moore with iTelescope.net (Pier 10),
Murray Kenney (Pier 11) and
Mike Hankey (Pier 12),

In the multi-telescope building.10 we have Kevin Morefield (Pier 4),

NARIT (Pier 8),
Martin Pugh (Pier 9),
Korean Astronomy and Space Science Institute (KASSI) (Pier 11),
Jeffery Lovelace (Pier 13 and 18),
SRO's experimental planetary telescope (Pier 16),
Mike Perron (Pier 17),
and Mel Helm (Pier 19).
All but 2 spots have been spoken for in the new building.

We are proud to note you will recognize some important names from a diverse spectrum of astrophotography and astrophysics, from advanced imagers to telescope manufacturers and space industries.

SRO: Our Site and Infrastructure Continued:

PlaneWave CDK 700 (28") to smaller refractors. We also have almost 5 acres of additional undeveloped land as future expansions becomes necessary.

Construction of the observatories was carefully planned to optimize usability. There are no concrete slab floors (which can absorb and release heat) and the larger observatories are uniquely designed with 9 foot ceilings making any contact of the ceiling and telescope virtually impossible regardless of the position of the telescope. The operation of the roof in each building is automated and will close under adverse weather conditions. Custom observatories for 1-meter class telescopes and larger have been designed and can be made available within three to six months of request.

Environmentally, there is no question that SRO is unique and well suited for remote astronomical imaging and data acquisition. However, without a sound and robust infrastructure the site would be essentially useless. Because of this, we have also made sure to provide everything necessary for a first class imaging experience. This includes:

- 1) Prompt on-site assistance and support
- 2) Robust internet connectivity including satellite emergency backup.
- 3) Seamless, weather dependent smart roof control
- 4) Customized integration hooks with products like ACP Expert for complete automation control
- 5) Accurate seeing and weather info

In terms of service, we

provide 10hrs of free initial set-up assistance and up to two hours per month of free on-site technical support. This is generally sufficient for the vast majority of our clients. However, should additional technical assistance ever be needed, we offer 10 hour 'blocks' of support time at a nominal cost. Our technical assistance is provided by highly skilled on-site personnel. Experience has shown us that most repairs can be performed on-site, but of course we are also able remove and ship out any items that might need more professional services. Because we are located within 50 minutes of Fresno we also have extensive access to many other services including computer repair, pier fabrication and machine shop services.

As far as networking is concerned, internet connectivity is a particular strength for SRO, as over the last two years we have had state of the art fiber optic cables installed and integrated into the site infrastructure. This has given us uplink speeds of up to 100 Mbps, which is rare for most remote imaging sites, and enables imaging to proceed very smoothly. SRO also has satellite secondary connectivity continuously operational to provide for backup and emergency access should that become necessary.

Roof control, important for the safety of the telescopes, is an area that we have spent a great deal of effort on. SRO uses an intelligent roof management system based on the commercially distributed 'm1OASYS' roll-off roof controller coupled with a custom developed roof management application that

monitors real-time weather conditions and responds accordingly. SRO's roof management system will open or close an individual roof in response to changing weather conditions. Weather is monitored onsite utilizing a number of weather telemetry capture devices with the data fed directly to the real-time roof monitoring app over the site communications network. Current weather conditions are then evaluated once each second for any kind of actionable changes in conditions; i.e., cloud cover, humidity, dew levels, and/or precipitation. Should an actionable weather change be detected, the roof will then be closed to protect our clients' equipment from any kind of adverse conditions. Improvements in weather are also monitored in real-time and once good observing conditions have been re-established, the roof will re-open to provide optimal client access to productive observing time. To ensure reliability, critical infrastructure components are backed up with multiple devices and the SRO building design is such that a roof can be closed with scopes and equipment in any position. The quality of our telemetry data has also been carefully attended to. We use RainWise onsite weather monitoring equipment and CloudWatcher, commercial grade equipment which was chosen for its ability to produce accurate and consistent readings.

Put it all together and this makes Sierra Remote Observatories one of the premier observing sites in the country. If you are not already one of our members, we welcome you to come and visit SRO.

A few of SRO's telescopes:



Martin Pugh's 17" PlaneWave CDK



Samuel Lising's Starfire 130



NARIT's PlaneWave 0.7 meter CDK700



Building 9 at full Capacity

A BRIEF SUMMARY OF SIERRA REMOTE OBSERVATORIES

Corporate Address:

Sierra Remote Observatories
1865 East Alluvial Ave
Suite 102
Fresno, CA 93720

General Questions:

SROinfo@icloud.com

Support:

Sam Miller
Technical Assistance:
samsomiller@gmail.com
559-824-4771 (PST)

Mel Helm

Co-Owner
SROinfo@icloud.com
559-977-7904 (PST)

Keith Quattrocchi

Co-Owner
drquattrocchi@earthlink.net
530-401-0643 (PST)

Larry Van Vleet

Co-Owner
larry@lvvnet.com
720-244-1407 (MST)

Sierra Remote Observatories (SRO) is a dedicated site for state-of-the-art robotic/remote astronomical data acquisition and imaging. We are uniquely located in the center of California's Sierra Nevada Mountains, about 50 miles south of Yosemite National Park. In addition to having excellent darkness and seeing, SRO's location is unique in being within an hour of a major metropolitan area and international airport, making access to the facility and to expert personnel unusually easy. At nearly 5000 feet, on top of Bald Mountain, the site was chosen for its excellent seeing conditions and accessibility. Summer intrinsic seeing quality FWHM measures 1.0 arcsecond. The site is very dark at 21.78 magnitudes/sq arcsecond, V band. With excellent seeing, an extremely low incidence of thunderstorm activity, average wind speeds of only 1 mph, maximum wind gusts averaging only 10 mph, no summer monsoons, on-site services, an average of 237 photometric nights each year and easy access, Sierra Remote Observatories offers the professional scientist and amateur imager an excellent imaging location. Since first light in May of 2007, SRO has continuously operated multiple observatories for both professional research and amateur imaging.

There are 8 individual observatories which each house one or two telescopes and larger observatories which each contain 14 telescopes of various sizes, ranging from a 0.7 meter [PlaneWave](#) CDK700, to smaller refractors. The larger observatories are uniquely designed with 9 foot ceilings, making any contact of the ceiling and telescope virtually impossible, regardless of the position of the telescope. The operation of the roof in each building is automated and will close under any adverse weather conditions and reopen when the weather improves. Custom [AstroHaven](#) clamshell dome observatories for 1 meter class telescopes have been designed and can be made available within 3-6 months. Machine shop services and on-site technical personnel for repairs are available.

A Word From the Owners

We hope you've enjoyed SRO's forth newsletter. They will be coming out every 6 months (biannual), giving us a chance to update everyone on what's new at SRO. The three of us (Keith Quattrocchi, Mel Helm and Larry Van Vleet) appreciate the many kind words and great work that has come out of SRO. We never imagined that APODs would be weekly events. And we never thought that serious peer reviewed studies would emerge from SRO. What we did hope was we'd find a quiet, dark and clear place to image.

That we found, and much more.

One of the most rewarding aspects of our work at SRO is getting to know all the members and seeing the remarkable work they produce. With clear skies it seems everyone becomes an advanced imager and most far surpass any skills we (the owners) might collectively have. It is equally rewarding to see the incredible research produced at SRO by our professional astrophysicists.

We have focused on perfecting our

infrastructure and getting the word out regarding what we offer. We have spent a lot of time with roof control, with Larry adding a great deal of expertise in the area of programming and networking. Mel has upgraded our roof motors and weather detection systems and has everything backed up on virtual computers. I have spent a lot of time with marketing issues. Sam Miller, our on-site technical expert, has done a lot to help those who need it, and is on-site whenever he's needed. Together we hope to make SRO better and better as time goes by. Most of all we want it to remain a friendly and collegial site known for its clear and dark skies.

We're on the Web!

www.sierra-remote.com

