SVAS OBSERVER
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Sacramento Valley Astronomical Society
Founded in 1945

Seasons Greetings

The SVAS Officers and Board members all extend a holiday greeting, with gratitude for all the help and support from you the membership! Looking foreword to another great year in 2015. We want to hear from each and every one of you, let's work together to make the SVAS the premier astronomy club in northern California! While we are at it, let's make it best in the Universe!

It's almost time for Stuart Schulz to install the show guard on HGO! Every year there is some discussion about winter star party sites. Weather permitting, it would be very cool (pun intended) to get together at HGO for at least one winter star party. The warm up room feels so good, and the high altitude winter skies offer up pristine viewing conditions of objects mostly unfamiliar to some of us. The 16" Ritchie and 12" LX200 scopes in the observatory observation deck are performing exceptionally well, eliminating the need to bring your own equipment. Plenty of hot coffee, doughnuts, perhaps microwave hamburgers and hot dogs, and warm clothes could be the ingredients for a stellar (again pun intended) evening under the winter stars!

Observer Editor

Inside This Issue

SVAS Event Calendar

Nov 21, General Meeting Friday at 8:00pm

Sacramento City College, Mohr Hall Room 3, 3835 Freeport Boulevard, Sacramento, CA.

Nov 22 **Blue Canyon, weather permitting.**

Nov 22 **New Moon**

Dec 19, General Meeting Friday at 8:00pm

Sacramento City College, Mohr Hall Room 3, 3835 Freeport Boulevard, Sacramento, CA.

Dec 20 **Blue Canyon, weather permitting**

Dec 22 **New Moon**

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Happy Holidays

Star Party Schedule for 2014

Nov 22
Dec 20th

Star Parties

Blue Canyon

18th Annual
Citrus Heights
Sunday FunDay
September 28th
Rusch Park
11:00am - 3:00pm

Citrus Heights Sunday FunDay is truly a great event for the SVAS! I regretfully missed it this year, so the old saying a picture is worth a thousand words really applies here. The top photo is one from last year, it has become a logo image exactly illustrating the gala atmosphere of the event. However, this year the blue skies were replaced with clouds and some brief rain, but it didn't deter the SVAS from having a great time sharing astronomy with the public! Special thanks to Jack and Beverly Sales for supplying the extra canopy to protect the scopes from the inclement weather.

I ask Wayne Lord, Kevin Normington, and Jack & Beverly Sales to take some photos in my absence, as you can see they did a fantastic job! The Hershel Wedge in focus with a slightly out of focus Walt Heiges looking on in the background is most interesting. The family photos on the next page are simply stunning! I think Kevin should start a portrait business.

Bill Hagberry's 13.4 lb meteorite is always a super hit with everyone. The young ladies expression below seems to say it all. Wow this rock has come a long way to visit us! I'm sure it got extra attention with the cloudy skies.

Kevin Normington
Wayne Lord
Jack & Beverly Sales
Photography
Credit

More great photos! Left to right; Walt Heiges, Forrest Lockhart, Wayne Lord, and Jack Sales. Kevin Normington below, you seldom see the photographer in the pictures. Wayne and Forest at the bottom.

Thanks to all that made this event a huge success!

October 8th

by Ralph Merletti

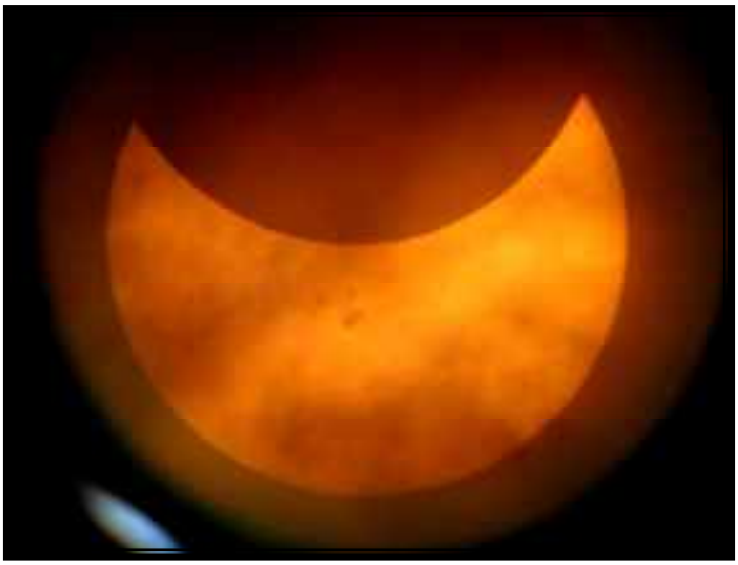
I observed the total lunar eclipse of Wednesday morning, Oct. 8, 2014 from the grounds of my address in the Fruitridge area of South Sacramento. I did not record the exact time when I stepped outside to begin observing between 1:30 and 1:45am?, but I think penumbral darkening may have just started. I watched through my 3" Swift refractor at 111x as the approaching limb darkened just before the onset of the umbra phase. Did you know that interior crater shadows can be seen along the limb until that part of the moon is inside the umbra, itself? As the Moon advanced through the umbra at a tangent, I switched to a 25x eyepiece to get a good view of the curve of the earth's shadow on the moon. Earlier or after, at 111x, I looked at a section of the lunar limb partially overtaken by the umbra. It was interesting to see one side still in some direct sunlight while the other was darkly shaded with a very diffuse shadow edge in between (Imagine that view just some 2,000 miles above the surface of the moon--with that magnification!). With just 25x, it was a good way to assess the current shape our world is in! I also used my 10x50 Orion Vista binoculars and my telescope's 10x finder to get different views of coverage, brightness, and emerging coloration. I used a ladder set up with an earth globe on top positioned/aligned approximately north/south with Northern California at the top of the globe to simulate the real-time situation. I took flash photos of the globe with the partially eclipsed moon positioned near the earth edge that was casting the shadow at the time. I also got photos through the 10x finder scope. I looked for pinhole images of the partial eclipse in the tree shadows, but this was not easy in the dimming moonlight. As the sky dimmed, the umbra took on a dull orange-brown color similar to the lunar eclipse last April. Just before totality was the best view with the widest range of light variation easily detectable.

During totality, as the dim orange-brown (darker in the lunar southern hemisphere, because that part was deeper into the umbra shadow) moon hung suspended in a starry sky, the maria remained visible. An "L" Danjon rating is difficult to make because the color and luminosity combination were different from the four levels traditionally given maybe L= 2 or 2.5 as a compromise? I decided to observe the planet Uranus, approximately one degree to the lower left of the Moon, but the view at 111x was disappointing. At that power, I could not discern a disk. It had a slight greenish color, but did I have the right object? I tried a couple of other points of light but they didn't show any characteristics of the 7th planet outward from the sun. Meanwhile the winter constellations' stars and clusters were spectacular in my binoculars. The Orion Nebula never disappoints! After an hour, totality ended and I did mostly the same observations/activities/photos in reverse. Later on, I had a great view of Jupiter and its four large moons as the planet was rising higher into the pre-dawn sky.

Partial Solar Eclipse Oct 23, 2014

by Lonnie Robinson

The Sun hid behind the clouds at the Sunday FunDay this month, so I thought we should give it another chance to shine. The weather reports all predicted heavy clouds with a front moving in right at noon, so I really didn't expect any views. Eureka! The Sun peaked out about 1:30pm here in Citrus Heights, so I rolled my trusty 8" Meade to the patio with my home-made Thousand Oaks Mylar Sun filter securely attached. There were a lot of high thin clouds, but by 2:00pm I could just begin to see the Moon starting it's run at the Sun. I don't have a high end digital camera or a eyepiece camera holder, so I attempted to hold my pocket camera hovering above the 32mm eyepiece long enough to snap some pictures. Not too bad considering! I'm sure they won't win any photo contests, but they are special because of the herculean effort to remain steady for the shutter duration.

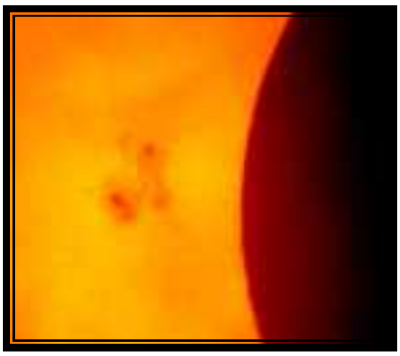


The clouds were definitely an issue, especially in the last photo, but the central sunspots are clearly seen. Looking foreword to a total solar eclipse expected in 2017, and an annular eclipse in 2023.

Solar Eclipse

by Ralph Merletti

I observed and photographed the partial solar eclipse of Thursday afternoon - October 23rd, 2014, from St. Patrick Academy, in the company of numerous students of different grades, along with several staff members, on the grounds of St. Rose parish in South Sacramento. (St. Patrick Academy is a regional Catholic school [serving TK through 8th grades] serving several parishes, as part of the education system of the Diocese of Sacramento.) A sky mostly covered with high clouds of varying thickness prevailed at the start of the eclipse. I set up my 3" refractor, with a 25x eyepiece, to project the image onto a white cardboard placed on a tripod beyond the scope. "First bite" was already in progress as I worked to get more things in place. For a real time simulation, I placed my large Earth globe in the approximate position of north-south alignment with Northern California on top. I used a small Moon globe to demonstrate the actual way in which part of the moon's shadow was moving across the northern part of Earth's Western Hemisphere.

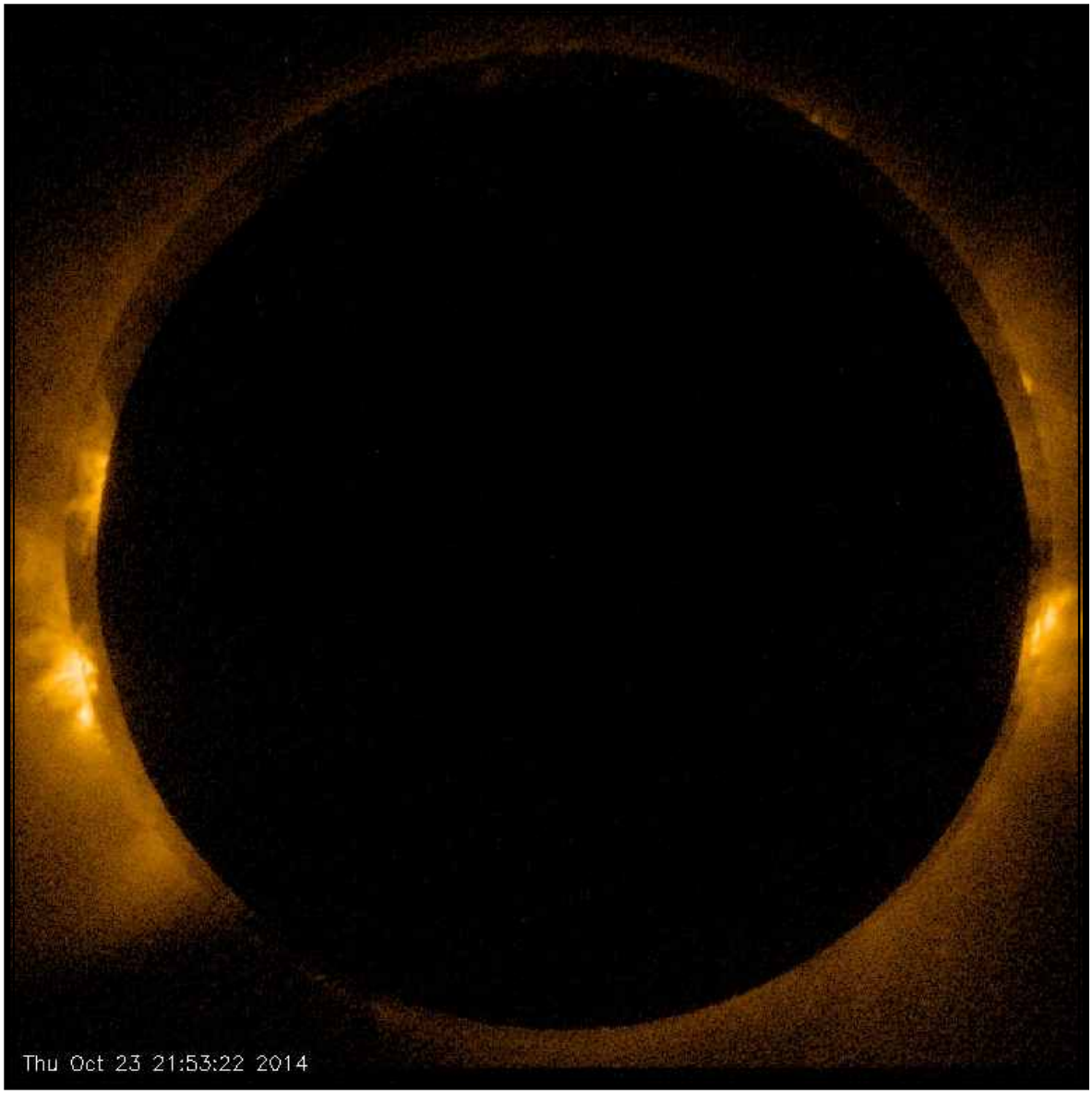


There were times during the early stages of the eclipse, when the projected telescopic image all but disappeared because of the clouds. As luck would have it, the thicker stream of clouds seemed to hang in the direction of the Sun. When the solar image was more definite, the most intriguing view was that of a large sunspot group in the Sun's southern hemisphere. I noticed this feature a few days earlier, and was glad to discover it was rotating towards the Earth-facing side of the Sun bringing it into view on eclipse day! With a magnitude of 0.52 (solar diameter coverage) in Sacramento, the Moon would not be covering the sunspots.

The cloud-affected image improved as mid-eclipse approached, but I was unable to definitely detect the overall daylight loss of 41% because most of the sky was still very cloudy. With mid-eclipse upon us, the upper grades science teacher helped move all of my equipment to the circular parking lot at the front of the school facing Franklin Blvd. On the way across the campus, pinhole "cookie bite" images of the eclipse from tree shadows in the central garden area were visible. Sky conditions improved a bit as I looked closely at the partial solar eclipse image. Since the sharp dark edge of the Moon did not cover the sunspot, I put my finger in front of it... the dark central part of the planet-sized sunspot was still lighter than the dark edge of the shadow of my finger! I had asked that the newly assigned pastor of the parish come over to see the projected solar eclipse image, and I snapped a picture of him with it; a few minutes earlier I had pointed out to him a pinhole image of the eclipse being cast on the front of the church from nearby tree leaves. As expected, during the last half hour of the eclipse the Moon's edge moved more rapidly off the solar disk.

So many pictures were taken on electronic devices, that anyone who was absent should have access to photographic mementos of the event. Surely, there had been a lot of "teachable moments" for the kids! For those students who did not observe the local large partial eclipse in May of 2012, this had to be their first ever event of this type. Hopefully, it could be the start of much more curiosity and scientific interest among our youth! I told the crowd earlier this was my 27th solar eclipse; hopefully the total solar eclipse of August 21, 2017, will be number 28. I would enjoy viewing it on the Oregon/Idaho border, in the path of totality.

Hinode Captures Images of Partial Solar Eclipse



A partial solar eclipse was visible from much of North America before sundown on Thursday, Oct.23. A partial eclipse occurs when the Moon blocks a portion of the Sun from view.

The Hinode spacecraft captured images of yesterday's eclipse as it passed over North America using its X-ray Telescope. During the eclipse, the new moon eased across the Sun from right to left with the Sun shining brilliantly in the background. And as a stroke of good luck, this solar cycle's largest active region, which has been the source of several large flares over the past week, was centered on the sun's disk as the moon transited!

Hinode is in the eighth year of its mission to observe the Sun. Previously, Hinode has observed numerous eclipses due to its high-altitude, sun-synchronous orbit. As viewed from Hinode's vantage point in space, ***this eclipse was annular instead of partial, which means that the entire moon moved in front of the sun but did not cover it completely.*** In this situation, a ring of the Sun encircles the dark disk of the Moon.

Led by the Japan Aerospace Exploration Agency (JAXA), the Hinode mission is a collaboration between the space agencies of Japan, the United States, the United Kingdom and Europe. NASA helped in the development, funding and assembly of the spacecraft's three science instruments.

Hinode is part of the Solar Terrestrial Probes (STP) Program within the Heliophysics Division of NASA's Science Mission Directorate in Washington. NASA's Marshall Space Flight Center in Huntsville, Ala., manages the Hinode science operations. The Smithsonian Astrophysical Observatory is the lead U.S. investigator for the X-ray telescope.

Image Credit: NASA/JAXA/SAO

One Giant Sunspot
6 Substantial Flares

A giant active region on the Sun erupted on Oct. 26, 2014, with its sixth substantial flare since Oct. 19. This flare was classified as an X2-class flare and it peaked at 6:56 a.m. EDT. This is the third X-class flare in 48 hours, erupting from the largest active region seen on the sun in 24 years.

X-class denotes the most intense flares, while the number provides more information about its strength. An X2 is twice as intense as an X1, an X3 is three times as intense, etc.

Image Credit: NASA/SDO

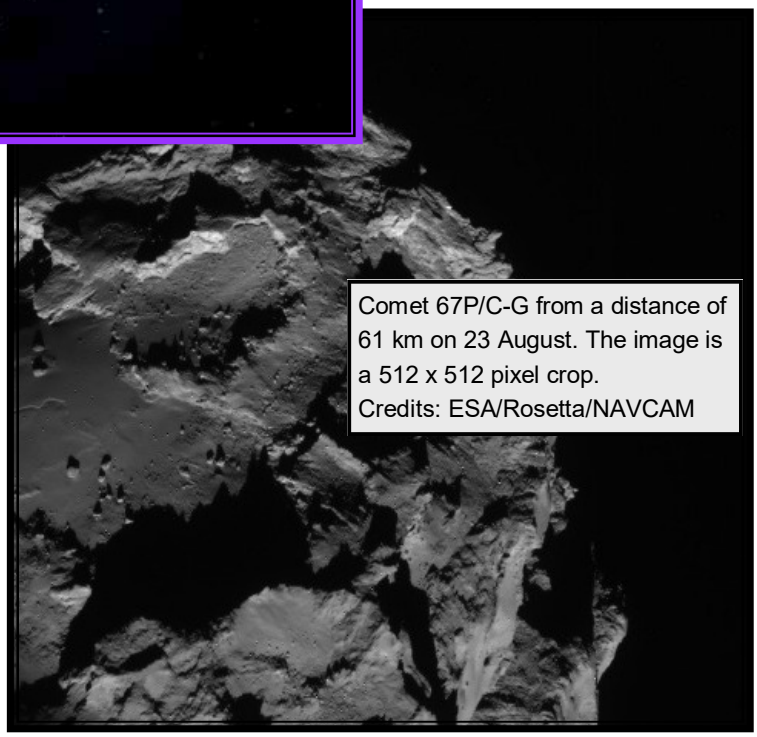
Comet Corner

Watching Rosetta

ESA/AOES Medialab

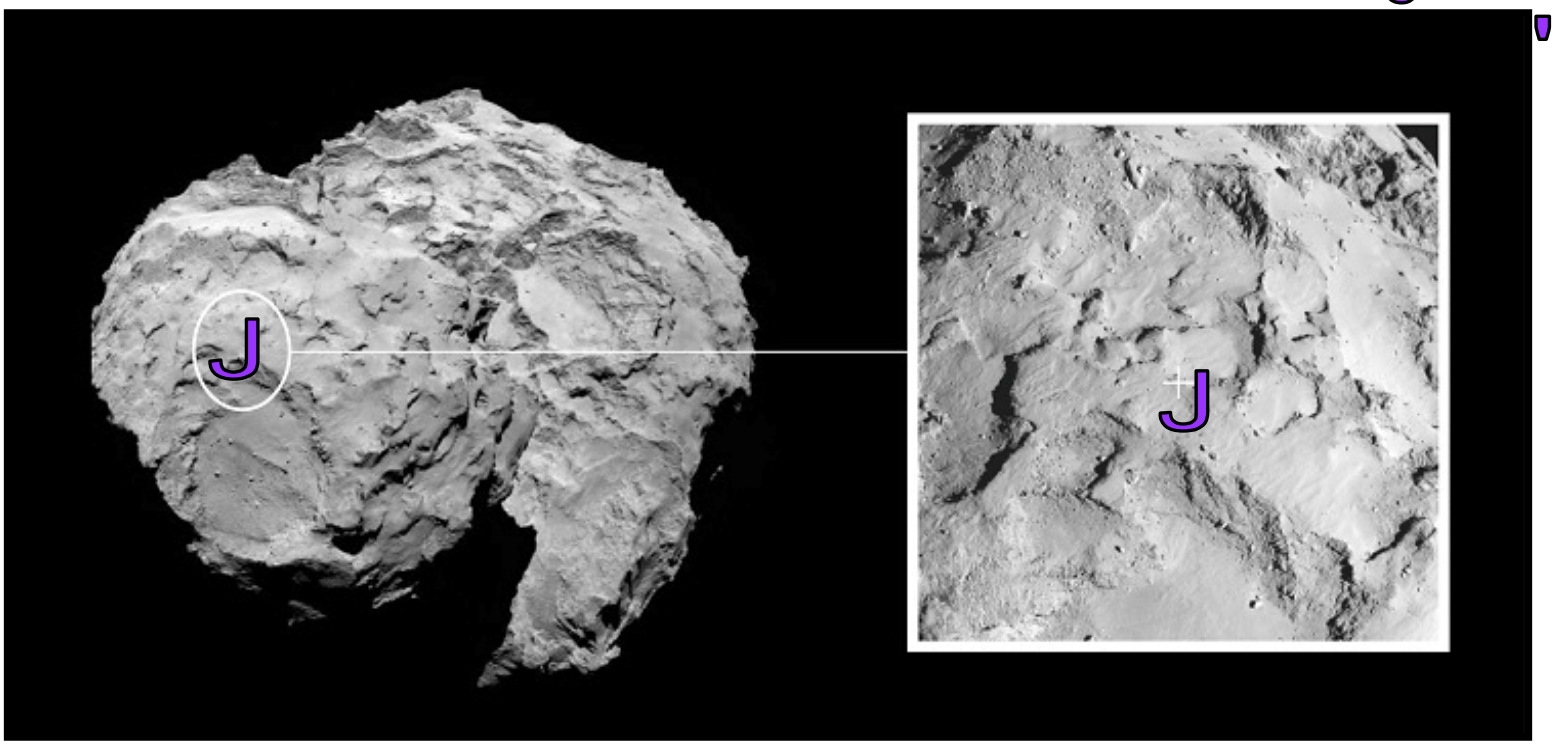
Europe's first half-century in space is set to culminate in the first-ever landing on a comet, by ESA's Rosetta spacecraft this November.

Until now, each NAVCAM image has covered the whole comet in one shot, but now that Rosetta is about 50 km from the comet, the nucleus is close to overfilling the NAVCAM field, and will do as we get even closer. As a result, we started taking NAVCAM image sequences as small 2 x 2 rasters, such that roughly one quarter of the comet is seen in the corner of each of the images, rather than all in just one shot. An example of one of these 512 x 512 pixel 'corner' images is shown at right, which was taken from a distance of 61 km. At this closer distance, the details of surface features are becoming much clearer.


Comet 67P/C-G from a distance of 61 km on 23 August. The image is a 512 x 512 pixel crop.
Credits: ESA/Rosetta/NAVCAM

The primary objective of the NAVCAM is navigation and its images are used by ESOC to identify and match the location of landmarks on the comet at different times. This information is then fed into the navigation process to improve orbit determination. The raster technique is used to ensure that the comet is always seen by the spacecraft and compensates for any uncertainties in the spacecraft's tra-

J Marks the Spot for Rosetta's Landing



The above image depicts the primary landing site on comet 67P/Churyumov–Gerasimenko chosen for the European Space Agency's Rosetta mission. Image credit: ESA/Rosetta/MPS for OSIRIS Team MPS/UPD/LAM/IAA/SSO/ INTA/UPM/DASP/IDA

jectory close to the comet. The images thus cover the uncertainty in the pointing, ensuring that the comet is always seen in each raster, and that in at least one of the images enough of the comet surface is seen to allow landmark recognition.

The Landing Site Selection Group of engineers and scientists from Philae's Science, Operations and Navigation Center at the National Center of Space Studies of France (CNES), the Lander Control Center at DLR, and scientists representing the Philae Lander instruments and ESA's Rosetta team, met at CNES, Toulouse, France, to consider the available data and to choose the primary and backup sites.

"As we have seen from recent close-up images, the comet is a beautiful but dramatic world – it is scientifically exciting, but its shape makes it operationally challenging," says Stephan Ulamec, Philae Lander Manager at the German Aerospace Center (DLR) in Cologne. "None of the candidate landing sites met all of the operational criteria at the 100-percent level, but Site J is clearly the best choice. The descent to the comet is passive and it is only possible to predict that the landing point will be within a "landing ellipse" (typically a few hundred meters) in size. For each of Rosetta's candidate sites, a larger area -- four-tenths of a square mile (one square kilometer) -- was assessed. At Site J the majority of slopes are less than 30-degrees relative to the local vertical, reducing the chances of Philae toppling over during touchdown. Site J also appears to have relatively few boulders, and it receives sufficient daily illumination to recharge Philae and continue science operations on the surface beyond the initial battery-powered phase. Provisional assessment of the trajectory to Site J found that the descent time of Philae to the surface would

Site J is on the "head" of the comet, an irregular shaped world that is just over 2.5 miles (four kilometers) across at its widest point. The decision to select Site J as the primary site was unanimous. The backup, Site C, is located on the "body" of the comet.

be about seven hours, a length that does not compromise the on-comet observations by using up too much of the battery during the descent.

Both Sites B and C were considered as the backup, but C was preferred because of a higher illumination profile and fewer boulders. Sites A and I had seemed attractive during first rounds of discussion, but were dismissed at the second round because they did not satisfy a number of the key criteria. Philae will touch down at the equivalent of walking pace and then use harpoons and ice screws to fix itself onto the comet's surface. It will then make a 360-degree panoramic image of the landing site to help determine where and in what orientation it has landed. The initial science phase will then begin, with other instruments analyzing the plasma and magnetic environment, and the surface and subsurface temperature. The lander will also drill and collect samples from beneath the surface, delivering them to the on-board laboratory for analysis. The interior structure of the comet will also be explored by sending radio waves through the surface toward Rosetta.

"No one has ever attempted to land on a comet before, so it is a real challenge," says Fred Jansen, the ESA Rosetta mission manager from the European Space Research Technology Center, Noordwijk, the Netherlands. "The complicated 'double' structure of the comet has had a considerable impact on the overall risks related to landing, but they are risks worth taking to have the chance of making the first ever soft landing on a comet."

Launched in March 2004, Rosetta was reactivated in January 2014 after a record 957 days in hibernation. Composed of an orbiter and lander, Rosetta's objectives since arriving at comet 67P/Churyumov-Gerasimenko earlier this month are to study the celestial object up close in unprecedented detail, prepare for landing a probe on the comet's nucleus in November, and track its changes through 2015, as it sweeps past the sun.

Comets are time capsules containing primitive material left over from the epoch when the sun and its planets formed. Rosetta's lander will obtain the first images taken from a comet's surface and will provide comprehensive analysis of the comet's possible primordial composition by drilling into the surface. Rosetta also will be the first spacecraft to witness at close proximity how a comet changes as it is subjected to the increasing intensity of the sun's radiation. Observations will help scientists learn more about the origin and evolution of our solar system and the role comets may have played in seeding Earth with water, and perhaps even life.

Rosetta is an ESA mission with contributions from its member states and NASA. Rosetta's Philae lander is provided by a consortium led by the German Aerospace Center, Cologne; Max Planck Institute for Solar System Research, Gottingen; National Center of Space Studies of France (CNES), Paris; and the Italian Space Agency, Rome. NASA's Jet Propulsion Laboratory in Pasadena, California, a division of the California Institute of Technology, manages the U.S. participation in the Rosetta mission for NASA's Science Mission Directorate in Washington.

For more information on the U.S. instruments aboard Rosetta, visit: http://rosetta.jpl.nasa.gov

Rosetta's Comet Fires Its Jets

The four images that make up this montage of comet 67P/ Churyumov–Gerasimenko were taken on Sept. 26, 2014 by the European Space Agency's Rosetta spacecraft. At the time, Rosetta was about 16 miles (26 kilometers), from the center of the comet.

In the montage, a region of jet activity can be seen at the neck of the comet. These jets, originating from several discrete locations, are a product of ices sublimating and gases escaping from inside the nucleus.

The overlapping and slightly dissimilar angles of the four images that compose the montage are a result of the combined effect of the comet rotating between the first and last images taken in the sequence (about 10 degrees over 20 minutes), and the spacecraft movement during that same time.

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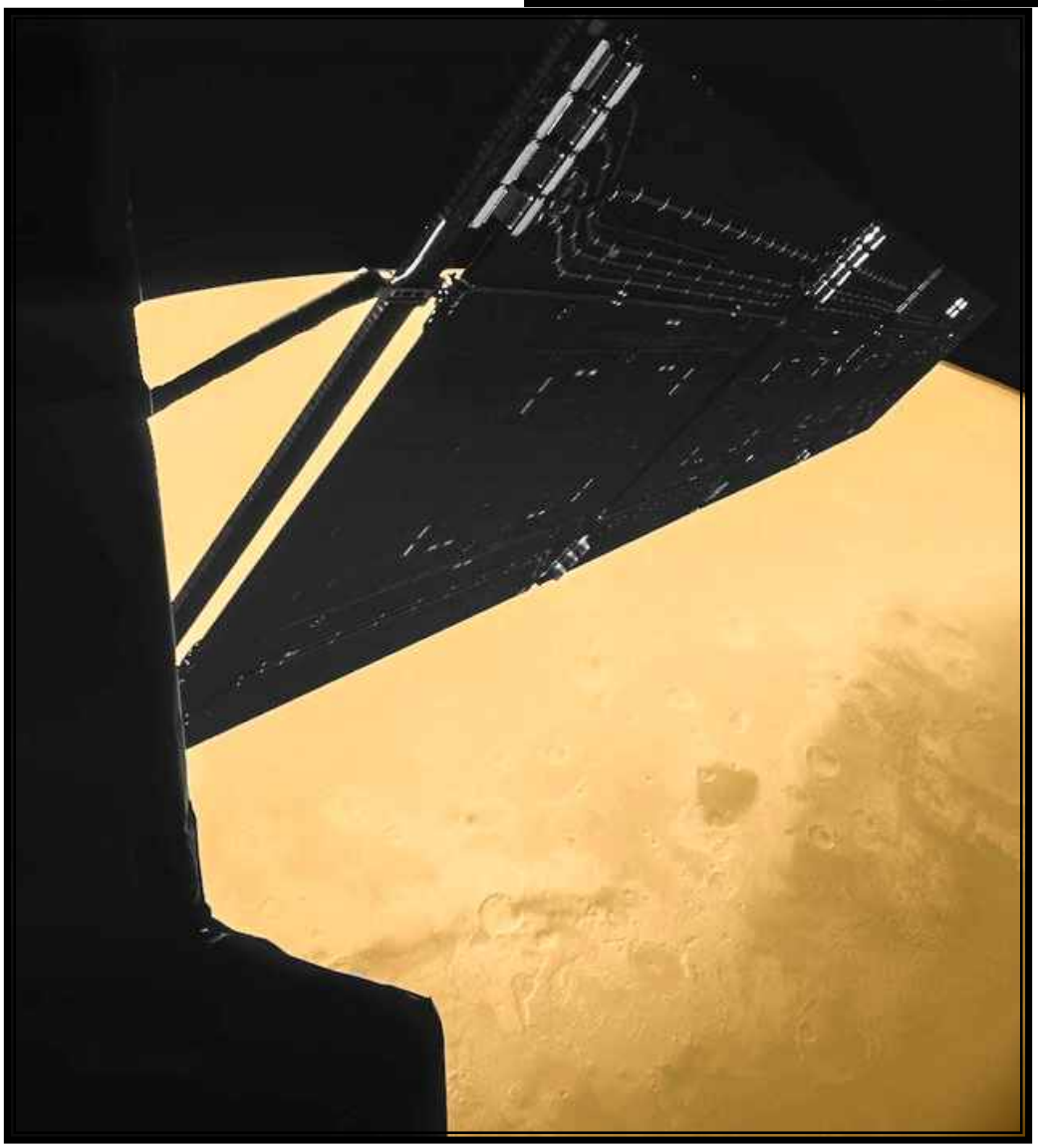
Image credit: ESA/Rosetta/NAVCAM

Rosetta Selfie at 16 km

Using the CIVA camera on Rosetta's Philae lander, the spacecraft have snapped a 'selfie' at comet 67P/ Churyumov–Gerasimenko. The image was taken on 7 September from a distance of about 50 km from the comet, and captures the side of the Rosetta spacecraft and one of Rosetta's 14 m-long solar wings, with 67P/C-G in the background. Two images with different exposure times were combined to bring out the faint details in this very high contrast situation.



Rosetta's Self-Portrait at Mars

On 25 February 2007 at 02:15 GMT, Rosetta passed just 250 km from the surface of Mars. Rosetta's Philae lander took this image 4 minutes before closest approach, at a distance of 1000 km. It captures one of Rosetta's 14 m-long solar wings, set against the northern hemisphere of Mars, where details in the Mawrth Vallis region can be seen.

Close Encounters at Mars; Comet Siding Spirng

This composite NASA Hubble Space Telescope Image captures the positions of comet Siding Spring and Mars in a never-before-seen close passage of a comet by the Red Planet, which happened at 2:28 p.m. EDT October 19, 2014. Image Credit: NASA, ESA, PSI, JHU/APL, STScI/AURA

NASA's Hubble Space Telescope has produced a unique composite image of comet Siding Spring as it made its never-before-seen close passage of a comet by Mars. This is a composite image because a single exposure of the stellar background, comet Siding Spring, and Mars would be problematic. Mars actually is 10,000 times brighter than the comet, so it could not be properly exposed to show detail in the Red Planet. The comet and Mars also were moving with respect to each other and could not be imaged simultaneously in one exposure without one of the objects being motion blurred. Hubble had to be programmed to track on the comet and Mars separately in two different observations.

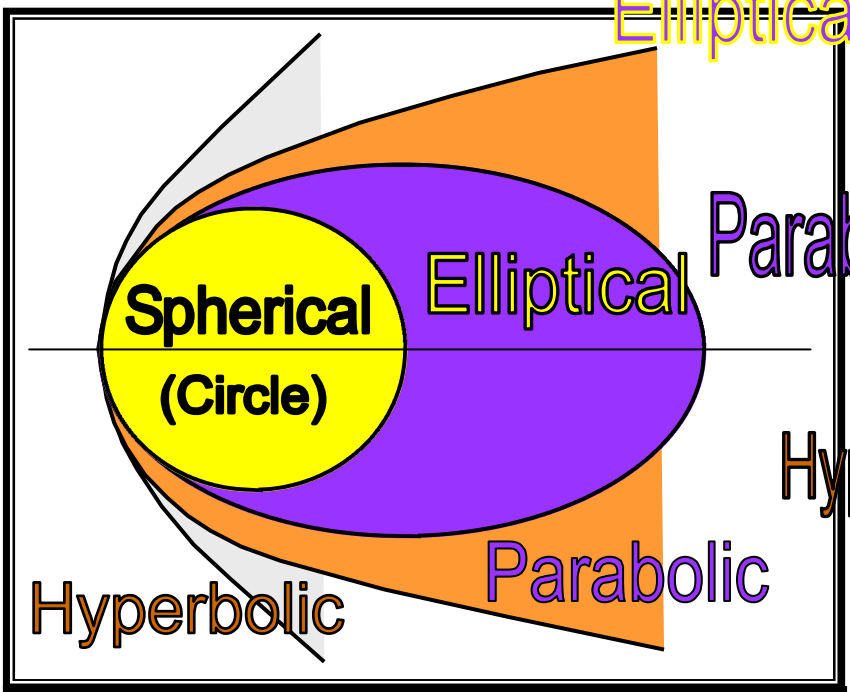
The solid icy comet nucleus is too small to be resolved in the Hubble picture. The comet's bright coma, a diffuse cloud of dust enshrouding the nucleus, and a dusty tail, are clearly visible.

SVAS ATM Connection

Nevada County Astronomers

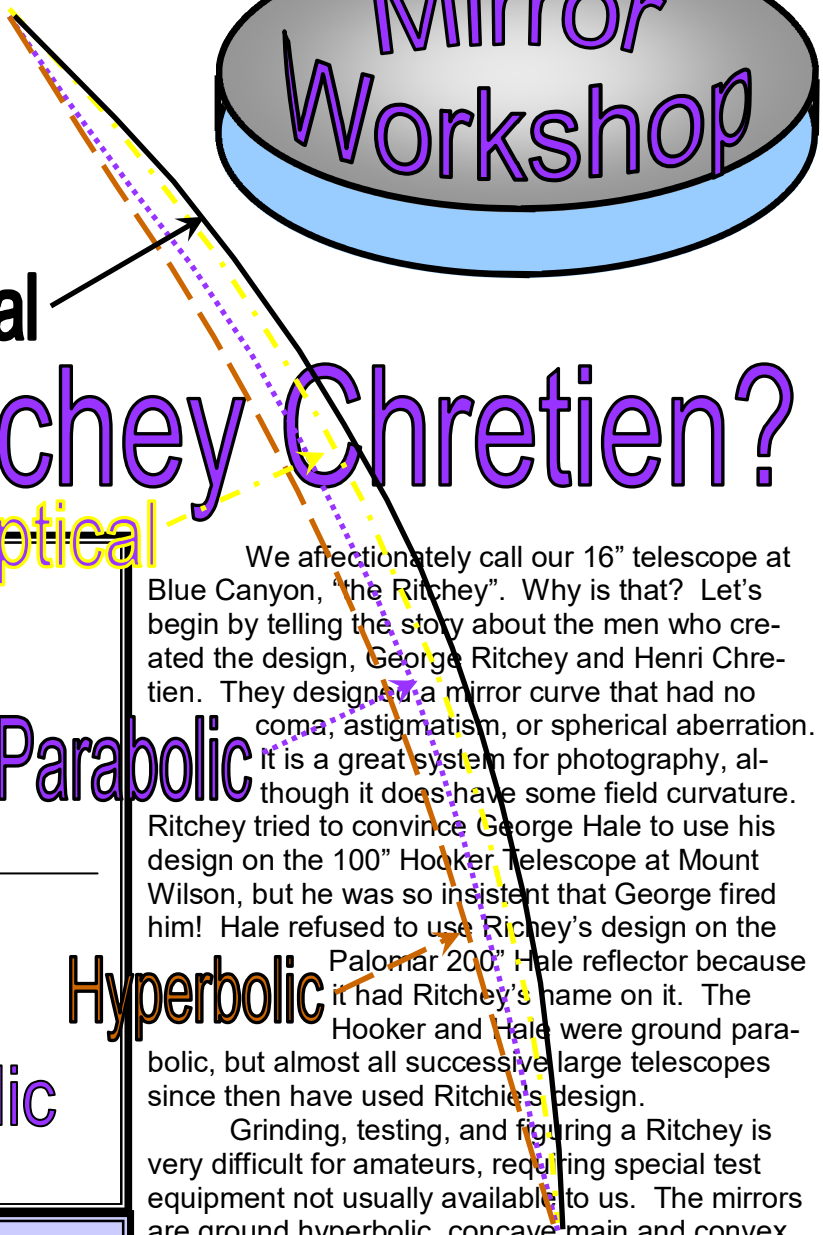
Mirror Workshop

What is a Ritchey Chretien?



Four Popular Reflectors

Newtonian:	Parabolic Primary Flat Secondary
Schmidt Cassegrain:	Spherical Primary ~f/2 Convex Secondary ~f/20 Schmidt Corrector Plate
Classic Cassegrain:	Parabolic Primary Convex Hyperbolic Secondary
Ritchey Chretien:	Hyperbolic Primary Convex Hyperbolic Secondary
Dall-Kirkham:	Elliptical Primary Convex Spherical Secondary Corrector Lens



We affectionately call our 16" telescope at Blue Canyon, "the Ritchey". Why is that? Let's begin by telling the story about the men who created the design, George Ritchey and Henri Chretien. They designed a mirror curve that had no coma, astigmatism, or spherical aberration. It is a great system for photography, although it does have some field curvature. Ritchey tried to convince George Hale to use his design on the 100" Hooker Telescope at Mount Wilson, but he was so insistent that George fired him! Hale refused to use Richey's design on the Palomar 200" Hale reflector because it had Ritchey's name on it. The Hooker and Hale were ground parabolic, but almost all successive large telescopes since then have used Ritchie's design.

Grinding, testing, and figuring a Ritchey is very difficult for amateurs, requiring special test equipment not usually available to us. The mirrors are ground hyperbolic, concave main and convex secondary, many in a matched sets. Therefore the Ritchey design is mostly reserved for professional opticians.

The different curves are so much easier to understand when you consider there are only four major ones to worry about, Spherical, Parabolic, Elliptical, and Hyperbolic. **Parabolic can only be one curve of any size, and it defines the thin boundary between an infinite number of different curved Hyperbolas on one side and an infinite number of Ellipses on the other.** The circle is unique too, it can be any size but only one shape. Mirror makers refer to either going Elliptical or Hyperbolic from the desired Parabola.

There you have it, easy stuff! Lonnie Robinson

Mirror Workshop Hosted by Bill Thomas & Lonnie Robinson

The Cygnus Wall

NGC7000 by Ken Crawford

I have been working on a large project consisting of a three panel mosaic using seven different filters with over 42 hours of exposure time. This is the part of NGC7000 (North American Nebula) called The Wall.

http://www.imagingdeepsky.com/Nebulae/NGC7000/NGC7000.htm

http://www.imagingdeepsky.com/

http://www.aicccd.com/

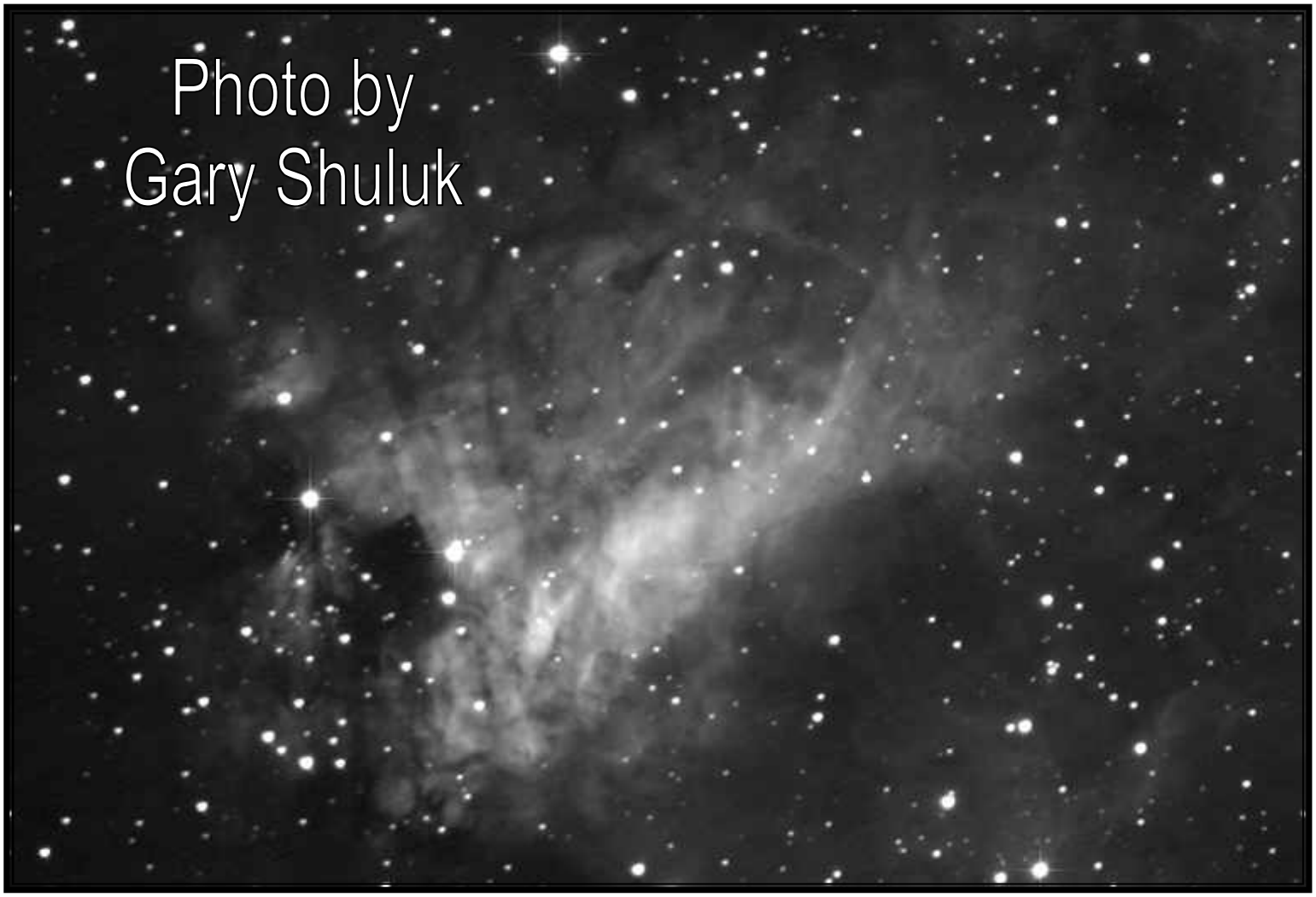
Image Exposure Details

Filter	Exposures
Clear/ Lum	360 minutes
Red	360 minutes
Green	360 minutes
Blue	360 minutes
Ha 5nm	360 minutes
OIII 3nm.	360 minutes
SII 5nm	360 minutes

RCOS 20" carbon truss
100mm FFChttp://www.aicccd.com/

Paramount ME
Apogee Alta u16m
SBIG ST402 Guider
Astrodon MegaMoag
Astrodon 50mm Sq Filters
MaxDL 5
CCDAutopilot 4

M17 Omega or Swan Captured with HGO's Ritchie

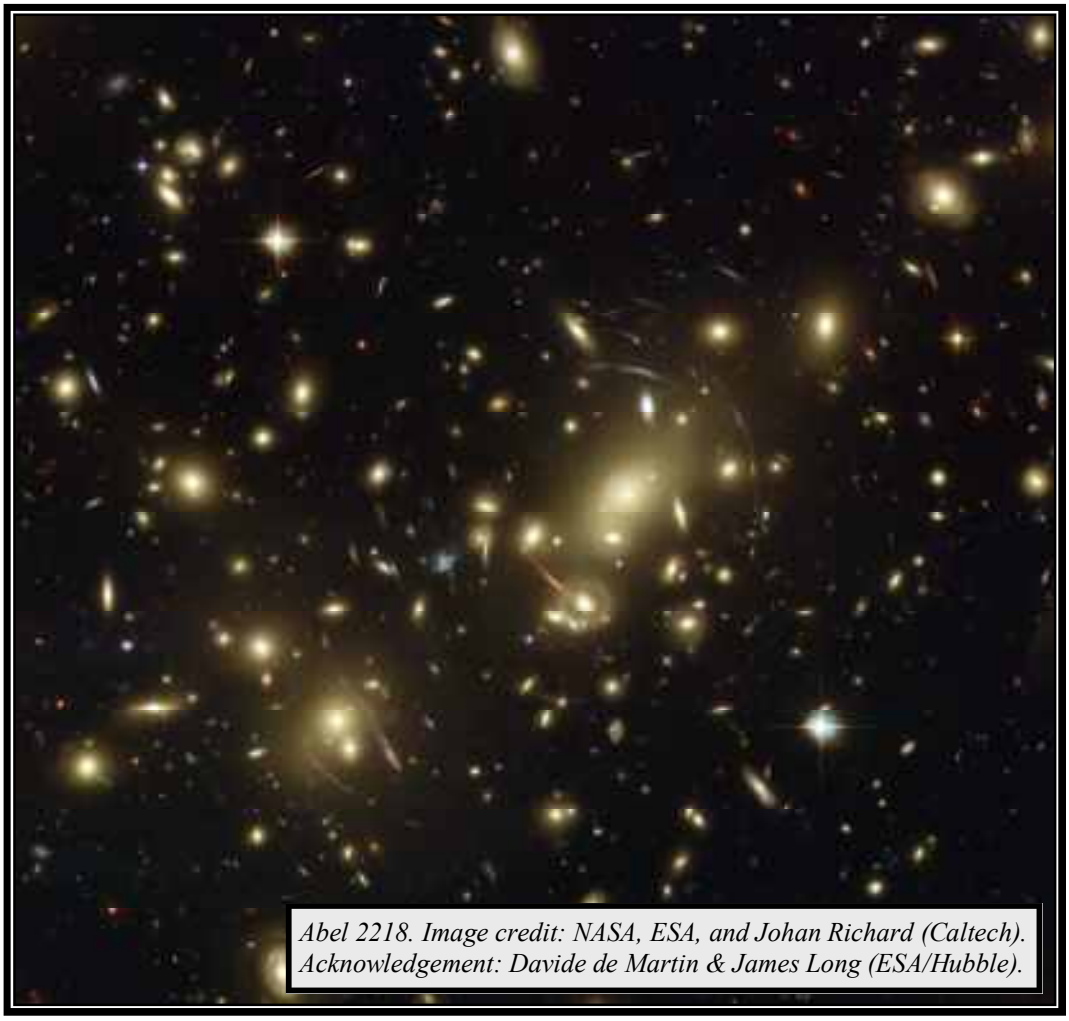


This is a section of m17 The Omega Nebula (or the Swan) taken with the 16″RC at HGO on 8/16/14. I shot a total of (20) 2 minute shots with a Canon 450D DSLR. I used my SBIG STV Guide Camera with the Stellarvue 80mm as a guide scope. I processed this image as a monochrome shot, and did not use any dark frame subtraction. Now that this scope is fully automated, the imaging possibilities with a basic camera are unlimited. I'm looking forward to what other members will come up with. I'd like to thank Lonnie, and Perry for all the work they've done in turning this old 16″ RC into a high quality goto scope, and Stuart for the extra donation to purchase the necessary autoguider to make it happen!

Gary Shuluk

A Glorious Gravitational Lens

By Dr. Ethan Siegel



Abel 2218. Image credit: NASA, ESA, and Johan Richard (Caltech). Acknowledgement: Davide de Martin & James Long (ESA/Hubble).

As we look at the universe on larger and larger scales, from stars to galaxies to groups to the largest galaxy clusters, we become able to perceive objects that are significantly farther away. But as we consider these larger classes of objects, they don't merely emit increased amounts of light, but they *also* contain increased amounts of **mass**. Under the best of circumstances, these gravitational clumps can open up a window to the distant universe well beyond what any astronomer could hope to see otherwise.

The oldest style of telescope is the refractor, where light from an arbitrarily distant source is passed through a converging lens. The incoming light rays—initially spread over a large area—are brought together at a point on the opposite side of the lens, with light rays from significantly closer sources bent in characteristic ways as well. While the universe doesn't consist of large optical lenses, **mass itself** is capable of bending light in accord with Einstein's theory of General Relativity, and acts as a *gravitational* lens!

The first prediction that real-life galaxy clusters would behave as such lenses came from Fritz Zwicky in 1937. These foreground masses would lead to multiple images and distorted arcs of the same lensed background object, all of which would be magnified as well. It wasn't until 1979, however, that this process was confirmed with the observation of the Twin Quasar: QSO 0957+561. Gravitational lensing requires a serendipitous alignment of a massive foreground galaxy cluster with a background galaxy (or cluster) in the right location to be seen by an observer at our location, but the universe is kind enough to provide us with many such examples of this good fortune, including one accessible to astrophotographers with 11" scopes and larger: Abell 2218.

Located in the Constellation of Draco at position (J2000): R.A. 16h 35m 54s, Dec. +66° 13' 00" (about 2° North of the star 18 Draconis), Abell 2218 is an extremely massive cluster of about 10,000 galaxies located 2 billion light years away, but it's *also* located quite close to the zenith for northern hemisphere observers, making it a great target for deep-sky astrophotography. Multiple images and sweeping arcs abound between magnitudes 17 and 20, and include galaxies at a variety of redshifts ranging from z=0.7 all the way up to z=2.5, with farther ones at even fainter magnitudes unveiled by Hubble. For those looking for an astronomical challenge this summer, take a shot at Abell 2218, a cluster responsible for perhaps the most glorious gravitational lens visible from Earth!

Learn about current efforts to study gravitational lensing using NASA facilities: http://www.nasa.gov/press/2014/january/nasas-fermi-makes-first-gamma-ray-study-of-a-gravitational-lens/

A new home for the Yolo!

Longtime SVAS member
Erick Grafe

For $ale

Meade 10" f4/5 Newtonian Scope for sale.

Completely gone through and modified to make it easier and safer to use. The feet now have leveling adjusters and the drive motor has an on/off switch. The bands that secure the tube assembly are trapped so they can't come off. Both RA and Dec pivots were cleaned and greased, the drive clutch was cleaned and adjusted. The optic's are typical high quality Meade. The original 1.25 plastic focuser has been replaced with a metal 2" Orion with a 1.25" adapter. The mirror's were cleaned and collimated. The scope comes with two eyepieces, a 1.25/15mm Kellner and a 40mm Scopetronix Maxview 2". A Stellarvue 8x50 right angle correct view finder that accepts 17 to 40mm eyepieces, and a Telrad are included. Designed for visual observations, it works fine with today's fast rate imagers (with careful polar alignment) and quite well with Orion's Deep Space Video Camera. Asking $1000,00. Contact Tim Tingey (916) 685-0935

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Where We Meet

General Meetings the third Friday of each month beginning at 8:00pm.
Board Meetings begin at 6:30 on the same day. All members are welcome.
Star Parties on weekends nearest the new Moon.

Sacramento City College
Mohr Hall Room 3
3835 Freeport Boulevard
Sacramento, CA.

WWW.SVAS.ORG

SVAS Observer

To Subscribe– First send in your membership application form below, with your dues, and upon approval by the Board of Directors the Observer newsletter (published bi-monthly beginning January) will be sent to your supplied email address in .pdf format. Second, request to join the SVAS Yahoo Group at http://groups-yahoo.com/group/svas-members. This group will keep you informed with the day to day current events and discussions.

Articles– Manuscripts and letters are welcome in MS Word, MS Publisher, or plain text format, and emailed to the SVAS Editor. Submission deadline is the 15th of the newsletter release month.

Advertising– Commercial, non-personal advertising, business card, and full page are available. Classified advertising is free to SVAS members.

SVAS Membership Application

Date___/ ___ /___ Membership (check one): New: ___ or Renew:___

Number of months until June (include June) #Months_____

Student- (student ID required) multiply by $2 per month_____

Family/ Individual multiply by $3 per month_____

Observatory (+membership & approval) multiply by $4 per month_____

Additional tax deductible contribution: Amt $ _____

July 1 is the annual renewal date Total Amount$_____

Name_____

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City _____ Zip_____ (Please Print)

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Detach and mail with payment to: SVAS Membership Application
PO Box 15274
Sacramento, California. 95851-0274

Note: It may take the SVAS Board of Directors 30 or more days to process and approve this application.

By signing this application, I acknowledge I have accessed the SVAS website, read and understand the SVAS bylaws and the rules governing the USFS Special Use Permit. In doing so, I agree to abide by the respective "terms and conditions" of each as they relate to the SVAS, use of its property and its facilities. I further understand and acknowledge that failure to abide by these "terms and conditions" can result in revocation of use privileges and/or SVAS membership.

Required Signature

_____

Date_____

Observatory Membership Approvals

The benefits of a regular membership plus private use of the Henry Grieb Observatory (HGO) at Blue Canyon. You must be a regular member for six months or longer, be certified and approved by the Observatory Director, and then be approved by the SVAS Board of Directors.