SIRIUS ASTRONOMER

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The Newsletter of the Orange County Astronomers

May 2009 *Free to members, subscriptions $12 for 12 issues* **Volume 36, Number 5**

Don Lynn created this image of IC4603,4,5,6, a region of nebulosity between Antares and Rho Ophiuchus, using an Internet telescope based in Australia on 3/26/09.

OCA CLUB MEETING

The free and open club meeting will be held Friday, May 8th at 7:30 PM in the Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. This month, Mike Simmons will be speaking on a topic to be announced.

NEXT MEETING: June 12th

STAR PARTIES

The Black Star Canyon site will be open on May 16th. The Anza site will be open on May 23rd. Members are encouraged to check the website calendar, for the latest updates on star parties and other events.

Please check the website calendar for the outreach events this month! Volunteers are always welcome!

You are also reminded to check the web site frequently for updates to the calendar of events and other club news.

COMING UP

The next session of the Beginners Class will be held on Friday, May 1st at the Centennial Heritage Museum at 3101 West Harvard Street in Santa Ana.
GOTO SIG: TBA
Astro-Imagers SIG: May 19th, June 16th
Remote Telescopes SIG: May 27th, June 24th
Astrophysics SIG: May 15th, June 19th
Dark Sky Group: TBA

May 2009 President's Message

By Barbara Toy

From the changes in the last week or so as I write this, I expect that our briefly verdant hills will be completely gold (or brown, if you're not into romance) by the time you see this, though the mustard may still be showing its particular shade of gold over wide stretches of the countryside. Although it isn't our desire, we usually have healthy stands of mustard growing around the club observatory and other places on the Anza site by late spring. It can be a challenge to cut it down, as the stems tend to be very elastic. Besides this, we have all of the usual grasses and weedy plants found in relatively undeveloped areas of Southern California that dry out quickly once the rains stop and then contribute to the fire danger we face over the summer and fall months if they aren't cut back. So, May is our weed clearance month at Anza, with May 31st as the deadline for weed clearance around all of the developed areas on the site.

The pad holders and member observatory holders all have the obligation to clear the areas around their pads and observatories. We also need to have the areas around the Football Field and Anza House as well as the club observatory cleared, but for those areas we have to rely on volunteer help, as no one has specific responsibility for them. If you can help with clearing weeds in these "general use" areas, it would be very much appreciated. We have some weed whackers available of different types, but not much in the way of hand tools, so please remember to bring your favorite implements of destruction on your next few visits out to Anza, and put them to good use bringing the local vegetation under control.

This is also the season when various critters that live on our site dig holes – sometimes quite sizable – in areas where someone would be likely to step in them. If you see any of these, please fill them in whenever possible.

We can use some cleanup around various areas of past construction around the Anza site, as well. There are remnants left from the roof work around Anza house and the club observatory, and debris of different sorts in other areas, as well. Our kind neighbors across the street, Dave Radosevich, Jim Hannum and John Kearns, have kindly offered the use of their trailer to help haul this debris to the local collection area (another piece of possibly helpful information – we don't have an actual dump in the area around the Anza site), so we need help getting it all collected into piles for transport, then put into the trailer and actually taken to the collection site; unfortunately, the trailer probably won't be available for the May star party, as Dave, Jim and John will most likely be at RTMC (see below), so the target for transporting the debris to the collection area is the June star party, but stacking things into removable piles can start before that. All of this will help make Anza more attractive as well as usable, and, if you are one of the people who is out there regularly, please make a point of joining this effort.

Critter Alert

With warmer weather, all of our local critters are out of hibernation carrying on with their other activities of life, some of which unfortunately intersect with our own activities. We tend to see more of this at Anza than Black Star Canyon, but both areas are critter-intense, and it's wise to take precautions to avoid problems. With that in mind, here are some critters of concern:

Rattlesnakes are common throughout Southern California, including Anza and Black Star Canyon. We've had debates in the past about the best way to deal with snake bites if they happen (generally, attempting to suck out the venom is *not* recommended), but it's far better to avoid getting bit in the first place. We have some members who are experienced in dealing with snakes and skilled in killing venomous snakes without getting bitten – if you're like most of us, however, with theoretical rather than practical knowledge in this area, it's better to leave snake extermination to these more experienced people and deal with snakes by sticking to open roads and walking areas where you are more likely to see them if they are in striking distance than in bushy areas, making noise as you move around so they have a chance to avoid you, and being aware of your surroundings and of the ground in front of you, so you see any snake before it becomes a problem.

Our other main venomous concern is Black Widow Spiders – also very common in Southern California and a significant nuisance at Anza (more than at Black Star Canyon, because of the way we use the site). They are often found in enclosed areas that haven't been opened for a while, such as storage sheds, and the club observatory restroom and warming room (to name a few places I've found them). It's a good idea to check before going into any structure at Anza or before pulling things out of any storage area – and to be careful about putting your hands or any other part of your anatomy into any area you haven't checked for inhabitants (there are some other critters you don't want to come in direct contact with as well, such as scorpions).

We also have a lot of mice and rats at Anza, and, in spite of our efforts to discourage them, they often invade and nest in buildings on the site. While bites are a concern, their droppings are probably more of a concern from a health standpoint.

That's one reason it's important for the people who use Anza House regularly to keep it clean, and to be sure that no food or garbage is left out to attract rodents.

Coyotes often visit the site, which is something to keep in mind in particular if you bring a small dog with you or have a small child who wants to explore. They generally stay away when the site is busy, as for star parties, but it's not uncommon to see one wandering through if there are only a few people around – I'm not aware of anyone who's had a problem with them, as they generally just keep moving along. Neighborhood dogs also visit the site – most are friendly, or just keep moving if not interested in socializing, but it's wise to be wary if they show up. I suspect that both coyotes and dogs are mainly interested in hunting rabbits and other critters, and they generally seem to have little interest in us.

Well, by now you might be wondering (if you aren't already a regular at Anza or Black Star Canyon) if maybe these sites are just a bit too dangerous for you – definitely they're not! This is all part of being closer to nature, and just a reasonable bit of vigilance is all it takes to remain safe in both locations. So bring your vigilance along with your enthusiasm for astronomy and (of course) your equipment whenever you come out to one of our dark sites, and have a wonderful and safe viewing experience!

RTMC

May is notable in local astronomy circles for the RTMC Astronomy Expo (originally the "Riverside Telescope Makers' Conference"). This is a star party, conference and astronomy shopping event that occurs every Memorial Day weekend at Camp Oaks, a YMCA camp not far from Big Bear City.

Even though the holiday weekend doesn't technically start for many of us until after work on Friday evening, the gates open for RTMC at 9:00 a.m. on Friday, and the vendors open their booths and start selling at noon. I've never yet made it to the Friday portion of the event (I've always been one of those people who have to work that Friday), but I'm told that's generally when the most intense swap meet activity happens. The swap meet part of RTMC is where individual astronomers can sell off their used equipment, so that's naturally a great place to look for bargains – and, while the activity Friday might be the most intense, the swap meet continues on Saturday and Sunday, frequently with the greatest activity between around 6:30 and breakfast.

You'll find a lot of familiar manufacturers and merchants in the vendor area, as well as some that I've only run into at RTMC. It will be interesting to see what kind of showing Meade makes there this year, given the company's current problems (in past years they had a very large booth and demonstration area, and also presented a series of talks in their booth). Celestron and a lot of smaller telescope makers will undoubtedly be there – one of the benefits of RTMC is the chance it offers to try out a lot of different telescopes from a lot of different makers (as well as a lot of amateur-made telescopes of different designs). Oceanside Photo and Telescope is another regular there, as is Astro-Hutech. I don't know who among smaller vendors is planning to be there this year, but in past years I've had the pleasure of chatting with a number of club members in their own booths, including Wally Pacholka, Chris Butler and Steve Eubanks.

So, a significant daytime activity at RTMC is shopping – besides the swap meet, experienced RTMCers check to see what bargains the vendors are giving, particularly on such things as items that have been lingering in their storage areas or maybe are a bit shop-worn – and talking to various vendors about their products, comparing equipment, and otherwise taking advantage of the array of vendors. There are also club booths and booths for Palomar and other astronomically interesting entities, where people can find out what more about them. While all this is going on outside, there are also talks on a lot of different astronomical and telescope-related topics going on in the main meeting area and often in additional rooms, as well – and a series of "Beginners" topics presented in a neighboring building, all day Saturday and Sunday, and a Keynote talk by Dr. Krupp of Griffith Observatory Saturday evening.

Friday, Saturday and Sunday nights are star parties – and this year RTMC is at new moon, so the sky should be very dark. Friday and Saturday nights are great nights to check out the vendor scopes and see how any that you might be interested in actually perform under the stars. Most vendors leave on Sunday, and so aren't there for the last star party night. There usually are a lot of interesting amateur scopes to look through, as well – telescope making is still very important to RTMC! – so be sure to check them out.

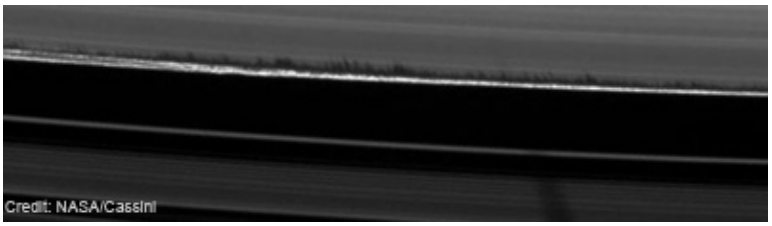
A couple of points of note for club members – we'll be doing our usual RTMC picture at the club booth at 1:00 p.m. on Saturday, so please be sure to come for the picture-taking if you're anywhere on site at the time. Then, if the weather is reasonable this year (last year it snowed; usually it's hot until sundown, when it chills down fast, so you need to be sure to bring warm and cold-weather gear), most of the club members hang out in front (as opposed to the back or inside) of the meeting hall Saturday and Sunday evenings for the famous RTMC raffles, another fun aspect of the event. If you haven't been to one of their raffles,

(continued on page 9)

AstroSpace Update

May 2009
Gathered by Don Lynn from NASA and other sources

Cassini (Saturn mission) – Analysis of Cassini radar data taken at the moon Titan has resulted in a map of elevations and has produced several surprises. The longest axis of Titan is toward Saturn, and the shortest from pole to pole, as expected. But it is more squashed from spherical shape than would be explained by centrifugal force and tidal forces from Saturn. This may imply that Titan was rotating faster and/or closer to the planet when it formed than it is now. But there are other possible explanations, including geophysical processes deforming the moon. This shape might explain why the hydrocarbon lakes are found near the poles, but not near the equator. A liquid hydrocarbon "water table" may exist beneath the surface, and the non-spherical shape causes the water table to be close enough to the surface to form lakes only in the polar regions. Hydrocarbons such as ethane are the only substances that would be liquid at the temperatures on Titan, around -290°F. Another surprise is that features that appear to be mountains or continents are actually lower than average elevation. The theory is that the mountain material is denser than average, and their weight causes them to force down the crust under them, making a basin under the mountains. It is thought that most of the crust of Titan is frozen hydrocarbons, but the mountain material is frozen water, which is indeed denser. On Earth, this doesn't happen because mountain and continent materials are less dense than average crust. Gravity measurements being taken by Cassini during its flybys of Titan will probably explain or confirm the surprises found by the radar data.

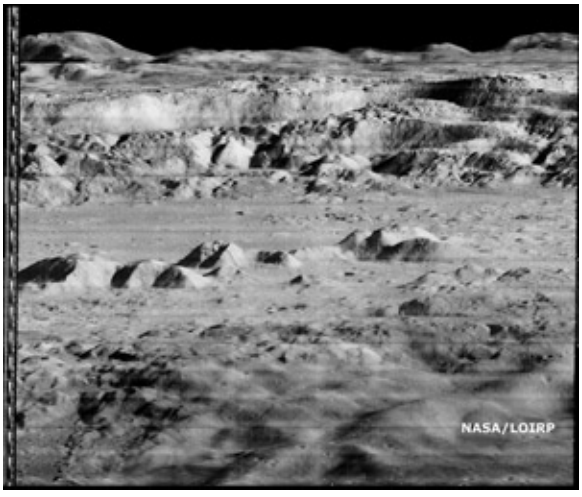


As Saturn nears the point in its orbit where the rings are edge-on to the Sun, the moons are often casting very long **shadows** onto the rings, like your shadow gets long at sunset because the sun angle is so low. In some of the pictures taken by Cassini of these moon shadows, the edges of some rings appear to have tiny dark scallops that were not there before. It is believed that these are shadows cast by particles within the rings. The particles within rings are thought to vary in size up to that of a house, but are too small to be seen by Cassini, even on close passes. But the long shadows are just barely large enough to be seen. Over the next few months the shadows will get longer, and we should get more information about the ring particle sizes.

Spitzer (infrared space telescope) observed the planet-forming disks around 44 Sun-like stars and 16 stars much cooler (M-dwarfs and brown dwarfs). Each star was 1-3 million years old, the age when planets should be forming. The observations were looking for hydrogen cyanide and acetylene in the stars' spectra. Acetylene was found at all stars, but hydrogen cyanide was found at only the Sun-like stars, not the cooler ones. Probably the cooler stars do not produce enough ultraviolet light to form hydrogen cyanide. It is a pre-biotic chemical; that is, life as we know it requires it. DNA contains adenine, of which hydrogen cyanide is a component. So it is likely that life does not form on planets orbiting cooler stars.

Spitzer also captured an image of the cores of 2 **galaxies** that have **collided**, and those cores are expected to merge soon (a few million years). Each core contains a supermassive black hole. The resulting collision is known as NGC 6240, and is located about 400 million light-years away in Ophiuchus. It is rare to capture a galaxy collision in this state, since merging of the cores proceeds quickly on galactic time scales. The collision has caused a burst of star formation, making it glow brightly in infrared. It is classified as a luminous infrared galaxy. When the cores collide, the galaxy is expected to become even brighter in infrared, which will allow it to be reclassified as an ultra-luminous infrared galaxy.

Lunar Orbiter – The team salvaging images from obsolete data tapes and restoring them, taken by the Lunar Orbiters of the 1960s, has released another amazing image. It depicts Copernicus Crater seen from a low angle. The restoration effort is being made in a rented abandoned hamburger stand in northern California, with support from both NASA and private sources. The tape drives being used were rescued from the scrap heap for just this purpose.



Mars Express – It is well known that Mars is covered in ferric oxides, contained within the dust that blankets much of the planet. This is what gives Mars its characteristic red hue. Mars Express has observed in the Aram Chaos area that there is a 4-fold increase in the spectral signature of ferric oxides. Scientists believe this indicates some mechanism that concentrated this mineral. This mechanism could be rain or snow. On Mars, ferric oxides are usually found with sulfates, but in this location, strong winds have blown away the lighter sulfates, leaving the ferric oxides behind. The concentrations appear below cliffs that contain sulfates.

Mars rover Opportunity has caught sight on the horizon of the raised rim of the crater Endeavour toward which it is now progressing. It still lies about 7 miles away. The rover stops and examines interesting rocks on the way, but is otherwise making good progress toward the crater. Wind in early April

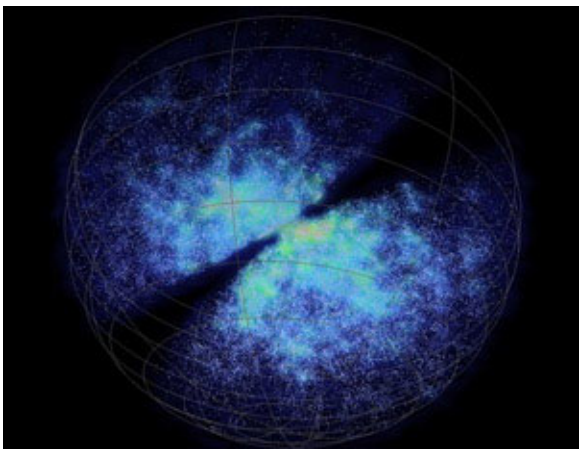
gave Opportunity's solar panels a cleaning, resulting in a 30% increase in power output.

Six-Degree Field Galaxy Survey (6dFGS) took about a decade to complete, using the 1.2-meter UK Schmidt Telescope in Australia, with a robotically controlled fiber optic system. The results have been released in the form of a map of 110,000 galaxies out to a distance of 1 billion light-years, spread out over 80% of the southern sky. This image shows each galaxy in the survey as a dot. Not only are locations given, but where each galaxy is headed and how fast. It does not go as deep (not as faint galaxies) as other recent surveys, but it covers a wider part of the sky. Galaxies' motions are composed of recession from us caused by the expansion of the Universe combined with locally caused motions due to gravity of nearby galaxies. The local part is called "peculiar velocity". The distances to galaxies in the 6dF data were calculated by a method depending on the width of spectral lines, and the expansion velocity is calculated from that. Subtraction produced the peculiar velocities. Additionally a map of gravity was produced by analyzing the peculiar velocities. Image credit: Dr. Chris Fluke, Centre for Astrophysics and Supercomputing, Swinburne University of Technology.

Integral (gamma-ray orbiting telescope) – Analysis of Integral data from an extremely bright gamma-ray burst in 2004 showed that the gamma rays were highly polarized. It is believed that gamma-ray bursts of this type occur when a rapidly spinning massive star collapses into a black hole. There are at least 4 theories on how the collapse produces jets that make the gamma rays. The polarization observed favors theories that involve synchrotron radiation, and most likely supports the theory in which the jets propel the star's magnetic field out into space, rather than other variations. Synchrotron radiation occurs when electrons spiral about magnetic field lines and give off radiation. Unfortunately Integral can detect polarization only on the strongest bursts, so further work will have to wait for another really bright burst.

HESS (ground-based gamma-ray telescope) has observed a blazar in gamma rays simultaneous with observations in visible light and X-rays. This is the first time such simultaneous views have been obtained. A blazar is a quasar whose jets are by chance aimed right at us, so it appears extra bright. During outbursts, the X-ray and gamma-ray emission rise and fall together. But the new observations show that during quiet times, the X-rays and gamma-rays do not correlate. But visible light and gamma-ray activity do correlate during quiet times. So far this has not been explained. Since the Earth's atmosphere absorbs gamma rays, you may be wondering how HESS operates on the ground. It uses the atmosphere as a detector, observing flashes high above that are caused by gamma rays hitting air.

Hubble Space Telescope (HST) has discovered that the star that exploded as supernova 2005gl was not the type expected by scientists. The star was a Luminous Blue Variable (LBV) star that had not lost its hydrogen envelope through powerful stellar winds. Theory says that an LBV star blows away its outer hydrogen layers before its iron core grows large enough to collapse and trigger a supernova. It is rare to find and conclusively identify the star in archived images after a supernova occurs. So it is not known if it is common for LBV stars that have still have their hydrogen explode. The theorists have a lot of work to do to explain this, whether common or not. This raises the question of whether there is more than one way to trigger a Type II supernova. One possibility is that the star was really a pair of stars too close to resolve. If that is the case, then the 2 stars both disappeared in images taken after the explosion. 2005gl occurred in the barred-spiral galaxy NGC 266, which is about 200 million light-years away in Pisces.



HST has been imaging for about a decade the giant elliptical galaxy **M87** in the nearby (54 million light-years away) Virgo galaxy cluster. Over this time a large blob of matter in the galaxy's jet has been brightening irregularly. The blob is 214 light-years from the core of the galaxy, from which it was ejected long ago. It is not clear what is causing the brightening, but the leading theories are that the jet hit a dust lane or gas cloud and then glows due to the collision, or that the jet's magnetic field lines got squeezed together, unleashing a large amount of energy. HST has been imaging the jet in ultraviolet light, while other telescopes have been doing so in radio and X-rays. The blob brightened from 1999 to 2001, again from 2002-2005, then faded, then brightened again. In 2005 it reached a peak brightness that was 90 times what it was at the beginning.

More supernovas – Two more instances have been found of a star in archived images that has been shown to be the one that exploded in a supernova. 2003gd, in galaxy M74, was found to be an M-supergiant star about 7 times the mass of the Sun. This is at the low end of the mass range that should theoretically become a Type II supernova. 1993J was a K-supergiant star that left behind a B-supergiant binary companion. Transfer of mass between the 2 stars is thought to explain why that supernova differed so much from others. In both supernovas, images after the explosion definitely showed the suspected star had disappeared.

Galaxy formation – Most recent observations of distant galaxies support that large galaxies which formed early after the Big Bang built up in size by devouring little galaxies. A new observation with the Subaru Telescope in Hawaii, viewing galaxies whose light took about 9 billion years to reach us, shows that the most massive galaxies then were about the mass that we see today in such galaxies. This implies that the most massive galaxies simply formed large from a very large cloud of matter collapsing rather than growing by devouring.

(continued on page 8)

2008 Messier Half-Marathon

by Bill Warden

There were a variety of folks on the football field, both old and new members for the 2009 Messier Marathon. Only a few marathoners; most were enjoying longer views and/or tinkering with scopes. I was flanked by Tim with a large dob using digital setting circles and Zoltan & Lilly with a 12" Meade SCT.

My sky quality meter read a respectable 21.14 mag/arc-sec sq at zenith just as the clouds rolled in. Interestingly clouds were bright white on the horizon, but dark overhead indicating dark skies locally. Seeing started fair, but improved for my C8. Unfortunately, the clouds started coming in at about 11 pm and shut me down by midnight. At least I got a decent night's sleep.

I totally wiffed on M74, never even saw stars in the field. Not surprising as this was a relatively late marathon date. Likewise, M110 was not a definite although M32 and M77 were easy. I wasn't that disappointed as I've vowed to start star hopping if I ever get all 110 using GOTO. Tore through the rest of the list nicely, with Tim helping me find bonus clusters NGC 2185 in M35 and NGC 1937 in M38. NGC 2168 in M46 was as bright as I can recall seeing it. I was unable to identify planetary nebula Minkowski 1-18 north of NGC 2168. I might have to give that a bit more time next year.

Comet Lulin was also visible, although I could not make out any tail. I think this is the first year that I actually observed a comet during the marathon. It occurs to me that at least one comet should be a requirement for a real MM.

One consolation was that the seeing seemed to improve as the clouds rolled in. The structure in M 51 was as good as I've ever seen it with my 8" SCT. Unfortunately, I took a peek through Zoltan and Lily's 12" SCT next to me and then spoke to Nick who extolled the virtues of Craigslist. So now I'm trying to get over a bout of aperture fever while eyeing a 16" light bridge (NO, I do not need another scope...).

Surprisingly, I was able to get through all the Virgo galaxies without a hitch even with light clouds. A rising M13 was barely resolved through the clouds. I hit the wall with low lying M68 and M83 in Hydra. I then wound things down with decent views of Saturn with my Denk binoviewer at 200x and chatted with a few scope junkies. Finished with 66 out of 110 objects.

Also enjoyed Non-Messier's NGC 2903 and 3628. The Eskimo was not as well resolved as I would have liked. I wiffed yet again on the California nebula, attempting with scope, finder, and binoculars. Next year...

Justin Kaidi created this image of M51 using a C9.25 with an SBIG SB2000 XM imager under moderate seeing in Anaheim, California on April 19, 2009, proving once again that serious astrophotography can be done from urban Orange County!

NASA's Space Place

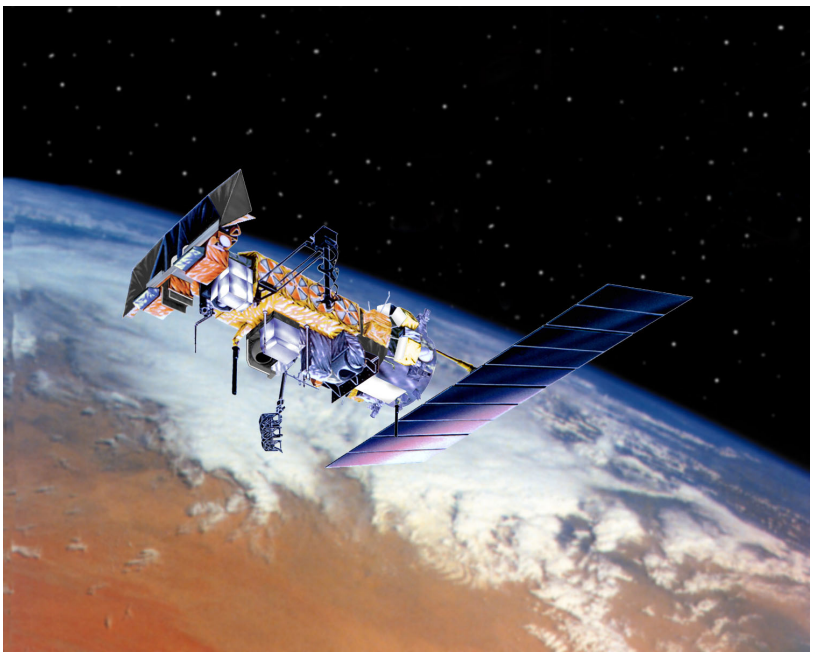
The Swiss Army Knife of Weather Satellites

Spotting volcanic eruptions, monitoring the health of crops, pinpointing distress signals for search and rescue teams.

It's not what you might expect from a weather satellite. But these are just a few of the abilities of NOAA's newest polar-orbiting weather satellite, launched by NASA on February 6 and turned over to NOAA for full-time operations on February 26.

Formerly called NOAA-N Prime and now renamed NOAA-19, it is the last in its line of weather satellites that stretches back almost 50 years to the dawn of the Space Age. Over the decades, the abilities of these Television Infrared Observation Satellites (TIROS) have gradually improved and expanded, starting from the grainy, black-and-white images of Earth's cloud cover taken by TIROS-1 and culminating in NOAA-19's amazing array of capabilities.

"This TIROS series has become quite the Swiss army knife of weather satellites, and NOAA-19 is the most capable one yet," says Tom Wrublewski, NOAA-19 Satellite Acquisition Manager at NASA's Goddard Space Flight Center in Greenbelt, Maryland.



The new NOAA-19 is the last and most capable in the long line of Television Infrared Observation Satellites (TIROS).

The evolution of TIROS began in 1998 with NOAA-K. The satellites have carried microwave sensors that can measure temperature variations as small as 1 degree Celsius between Earth's surface and an altitude of 40 kilometers—even through clouds. Other missions have added the ability to track large icebergs for cargo ships, monitor sea surface temperatures to aid climate change research, measure the amount of ozone in Earth's protective ozone layer, and even detect hazardous particles from solar flares that can affect communications and endanger satellites, astronauts in orbit, and city power grids.

NOAA-19 marks the end of the TIROS line, and for the next four years it will bridge the gap to a new series of satellites called the National Polar-orbiting Operational Environmental Satellite System. NPOESS will merge civilian and military weather satellites into a single system. Like NOAA-19, NPOESS satellites will orbit Earth from pole to pole, circling the planet roughly every 100 minutes and observing every location at least twice each day.

NPOESS will have yet more capabilities drawn from its military heritage. Dim-light sensors will improve observations of the Earth at night, and the satellites will better monitor winds over the ocean — important information for ships at sea and for weather and climate models. "A lot more capability is going to come out of NPOESS, improving upon the 161 various environmental data products we already produce today," Wrublewski says. Not even a Swiss army knife can do that many things, he points out.

For more on the NPOESS, check out http://www.npoess.noaa.gov. Kids can find out about another NOAA satellite capability—tracking endangered migrating species—and play a fun memory game at http://spaceplace.nasa.gov/en/kids/poes_tracking.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

(continued from page 5)

BLAST (balloon-borne telescope) imaged for 11 days in 2006 using submillimeter light (between radio and infrared) the same small portion of the sky that had previously been done in other wavelengths by the Hubble, Spitzer and Chandra space telescopes. Thousands of small clouds in our own galaxy undergoing star formation were seen, as well as galaxies up to such distances that their light took 3/4 of the age of the Universe to get here. The COBE satellite in the 1990s found a background of far infrared light that was attributed to starburst galaxies that were too small to resolve. Since the initial detection, higher-resolution experiments have tried to detect the individual galaxies. Combining the BLAST and Spitzer observations show that all of the far infrared background is indeed explained by individual galaxies. Star formation takes place in clouds of hydrogen gas with a small amount of dust. The dust absorbs the starlight from young hot stars, heats up to about 50°F above absolute zero, and emits far infrared and submillimeter light. As much as 50% of all light in the Universe may consist of this dust glow. The BLAST images show that most starburst activity took place far in the past – galaxies are generally declining to far below the star formation levels seen in the past. Much more should be learned about past star formation by 3 advances to occur in the next year or so: the Herschel space observatory, large format detectors for the Maxwell submillimeter telescope in Hawaii, and the first phase of the Atacama Large Millimeter Array in Chile.

Very Large Telescope Interferometer (VLTI) – As reported here last month, VLTI split the extremely close double star Theta1 Orionis C in the Trapezium. More details: It is the dominant and most luminous star in the Orion star nursery. The radiation from this double is ionizing the whole Orion nebula. The interferometer achieved resolution of 0.002 arc seconds, and found the double stars separated by 0.02 arc seconds. The pair was found to be in a very eccentric orbit with a period of 11 years. The masses are 38 and 9 times the mass of our Sun. In addition, the distance to the pair was very accurately determined at 1350 light-years, which is in excellent agreement with the distance derived from observations with the VLBA radiotelescope array.

LISA, though planned to study gravity waves after its launch in 2018, will also tell us a lot about asteroids. Every time an asteroid comes anywhere near LISA, it will disturb the position of the satellites slightly. Gravity wave scientists plan to recognize and compensate their observations for asteroid disturbances. But asteroid astronomers plan to use the disturbances. Any asteroid whose orbit is well known can have its mass accurately calculated from the satellite disturbances. Asteroid masses are hard to come by from other methods, such as accurately tracking a satellite of the asteroid or waiting for it to pass quite close to the Earth or another body. It is expected that at least 1 or 2 asteroids should pass close enough to LISA every year to yield accurate masses. If several asteroids per year are detected, it should be enough data to roughly calculate the distribution of asteroids by mass, a factor that is very poorly known.

STEREO (pair of solar space observatories) has observed more than 40 CMEs (coronal mass ejections) simultaneously from 2 viewpoints, allowing 3-D images. To the surprise of scientists, almost all of the CMEs have been shaped like croissants (the French pastries). CMEs get started as twisted ropes of solar magnetism. When the energy in the twist reaches some threshold, there is an explosion which expels the CME away from the Sun. The twisted ropes are fat in the middle and thin on the ends, and then the ends are pulled sideways and toward each other to complete the croissant shape. Use of the croissant shape model is expected to dramatically improve forecasts of severe space weather. When CMEs hit the Earth they can cause satellite outages, power blackouts, auroras, and radiation dangerous to astronauts.

As reported here last month, the **STEREO** spacecraft are entering the L_4 and L_5 Lagrangian zones, where combined gravity of the Sun and Earth stabilize orbits, and are being directed to search the areas for possible asteroids lurking there. Since analysis of the Apollo lunar samples in the 1970s, it has been believed that the Moon was formed by a planet about the size of Mars colliding with Earth soon after the planets formed about 4.5 billion years ago. One variation on this theory is that the Mars-sized planet formed in the L_4 or L_5 Lagrangian area, and was then perturbed by Venus or another planet into a collision with Earth. If true, then there should be remnants that formed the same time as the Mars-sized planet remaining in one of the Lagrangian areas. So observations made by STEREO may shed light on this theory. Although the collision theory of the Moon formation is on fairly solid ground, there is not yet observational evidence of the L_4/L_5 variation on that theory.

PAMELA (antimatter satellite) has observed an unusual spike of positrons (anti-electrons) in an energy range that is theoretically predicted to occur when dark matter decays. The observations were made in the energy range of 1.5 to 100 GeV. There is a way that a pulsar could make positrons with the observed characteristics. It is believed that further observations planned for the remainder of this year could distinguish a pulsar from dark matter decay.

New particle – Scientists at the Fermi Lab in Illinois have found evidence of a new particle, not predicted by theory. Its mass was measured at 4140 mega-electron volts, and it is being referred to temporarily as the Y(4140) particle. It decays into a J/psi and a phi particle. It has been suggested that it may be composed of a charm quark and an anticharm quark. But there are some problems with this interpretation. The Y(4140) particle is produced occasionally (several times per trillion) when a B+ meson decays. It may be related to another recently discovered particle being called Y(3940), which is believed to contain charm quarks.

Chandra (X-ray space telescope) has seen for the first time the interplay between the jets and hot winds from the material spiraling into a black hole. Both the jets and the wind eject matter that would otherwise fall into the black hole and cause it to grow. When the hot wind was seen to blow, the jets appeared to be choked off from ejecting material. When the wind dies down, the jet resumes. The rate of ejecting material remains about constant through this. The observed black hole has a mass about 14 times that of our Sun, but the details of matter falling in are believed to be the same in supermassive black holes, none of which are close enough to observe in this detail. The observed black hole is only 40,000 light-years away.

(continued next page)

(continued from page 3)

you should check it out – things can get surprisingly competitive between the three areas, and they usually have a lot of good prizes.

Besides all this, the main reason many of us go to RTMC is to see old friends, visit, meet new people, and otherwise have a great time. I know that some people, given the choice of going to Anza for the star party that weekend or going to RTMC are choosing to go to Anza instead (that's the difficult side of having RTMC fall at new moon) – but, especially if you haven't been to RTMC before, I really suggest you give it a try this year. For more information, see their website: http://www.rtmcastronomyexpo.org/.

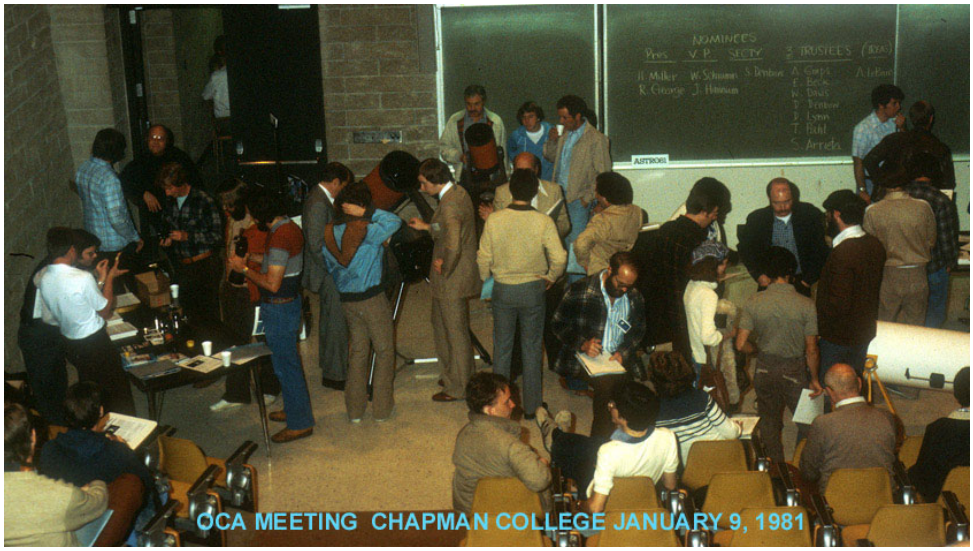
IYA 2009 — 100 Hours of Astronomy activities

The first of the International Year of Astronomy 2009 activities to affect us much locally was the 100 Hours of Astronomy. That ran from April 2 to April 5, and the outreach events that we had set on April 2, the first night of the event, were unfortunately canceled due to the weather. It's hard to show people the stars or anything else when the sky is covered with a heavy layer of clouds. Fortunately, the weather changed by Friday, and was clear the rest of the weekend, so the other activities went as scheduled.

The only events I was able to attend in person were the Beginners Class on Friday night and the Irvine Valley College event at the Spectrum shopping center on Saturday. The Beginners Class has been ably handled by Dave Pearson for several years now, since he took over primary responsibility for the class from Antonio Miro. Steve Short and I have been regularly assisting him, and I'm happy to report that we had an excellent turnout that Friday night.

The IVC program was a joint effort of all of the astronomy classes at IVC, with a lot of help from their professors, Roy McCord and Jennifer Tan. They set up two viewing areas, one by the Ferris wheel and one at the other end of the mall by the theaters. The design of the mall made it an excellent choice for this, as it is on one level and open air. Celestron kindly provided a lot of telescopes, which were primarily handled by students, working in shifts. Other students passed out flyers to the shoppers in other areas of the mall and directed them to be to viewing areas, so that they wouldn't miss the telescopes if they had any interest at all. The viewing was in two sections, with daytime viewing from noon to three o'clock and nighttime viewing from 6 to 9. The main problem with the daytime viewing was that the sun has been at an historic low of activity, the lowest in about a century, and so there were no sunspots to make the view more interesting. However, one of the Celestron people was able to find Venus, so there was an additional object people could look at during the day.

There were a lot of interested people looking through the eyepiece in both locations during the time I was there on Saturday afternoon. While at the public obviously benefited from this, what was even more exciting was the effect it had on the students, who definitely found this a rewarding project. I am happy to report that the administration at IVC apparently also sees the value of this project, and seems to be in support of making this an annual event. If that happens, it would be a really good addition to the local astronomy landscape. Roy, Jennifer and everyone who worked with them to make this a success deserve hearty congratulations for a job very well done.



The January 1981 OCA General Meeting. How many members were getting their clothes from the Carl Sagan Collection?

International Space Station (ISS) – The water recycling system appears to be working after a recent repair. Final tests of water samples brought back are being made before allowing the ISS crew to drink the water. The solar panels delivered during the last shuttle mission are producing full power. This means the station is ready for a crew of 6. For the past decade of construction, it could only support 3 people. Three more astronauts will launch May 27, to bring the ISS up to full crew for the first time. That crew will have representation from all 5 partners in the ISS: NASA and the space agencies of Europe, Russia, Canada, and Japan.

Neutron stars – A team of scientists using a cyclotron may be shedding light on the nature of neutron stars. They are measuring the symmetry energy in collisions of tin atomic nuclei at various nuclear densities. The computer models of neutron stars vary considerably in their descriptions of the crusts because the symmetry energy is not well known. Neutron stars have more than the mass of our Sun condensed into a ball of neutrons about 15 miles across. The density of the core is many billion tons per teaspoonful, and the crust must vary from nearly this density down to nearly zero at the surface. It is hoped that the variation of density over the top half mile of crust will be pinned down by the current experiments.

Instant AstroSpace Updates

A team of students and others from the University of Khartoum made 3 expeditions to the area in Africa where a small asteroid (named 2008 TC3) hit the atmosphere and exploded last October 7, and located 280 **meteorites**, weighing a total of 11 pounds, which fell from that explosion. They are unusual polymic ureilite meteorites, which are made of dark porous fragile rocky material.

Mars rover **Spirit** rebooted its computers at least twice in April, after which it was in a stable state, so controllers are cautiously diagnosing what caused the problem. It may have been related to new software recently loaded in the rover, or to age-related effects.

HST and Chandra images have been combined showing details for the first time of the **collision of 4 galaxy clusters**, in an object known as MACS J0717. X-ray emitting gas slows down more in a collision than the galaxies themselves, so the offset of the gas allows determining which way each galaxy has been moving.

Spitzer (infrared space telescope) has imaged in infrared nearby galaxy M33 and found it to be much larger than in visible light, apparently due to much cold material beyond where stars are visible. How the material got out that far is a mystery, but stellar winds and supernovas are possibilities.

Kepler, a mission to find planets when they pass in front of their stars, has returned its first images, and everything appears as expected. After a few weeks of calibration work, science observations will begin.

4/18/09 Black Star Canyon Star Party recap

by Steve Short

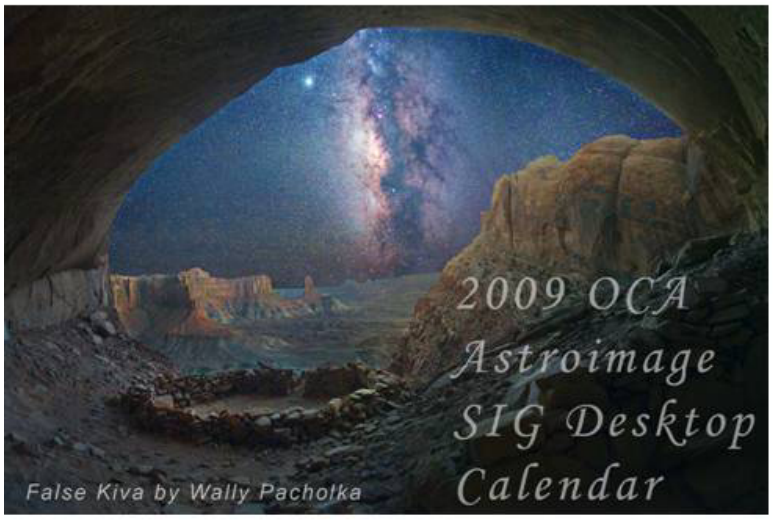
I opened the gate just before 7 PM and we already had a long line of cars waiting to get in. I noted that it was 74 F and the sky was absolutely clear.

As it got dark, we found Mercury but it was not much to see in a telescope. Somehow we missed seeing the Iridium flare at 7:41 PM. But Saturn was spectacular and we could see a few of the brighter moons.

I was not able to see any of the comets but might have spotted Ceres above the Lion. M3 & M13 were very clear and many of the members went galaxy hunting since the sky was so dark. Several of us had M81 & M82 in the same field of view with a 40 mm eyepiece.It was so warm that I didn't put on a jacket until 9:30 PM.

Everyone finally left by 11:30 PM as The Scorpion was rising in the SE. I closed the gate at 11:45 and noted that the temp had dropped to 48F.

2009 OCA Astroimage SIG Desktop Calendar - Now Available!



With Images by John Sanford, Ray Stann, Larry Gershon, John Castillo, Craig Bobchin, Bruce Waddington, Pat Stoker, Don Lynn, Gary Schones, Dave Snope, Jim Windlinger, Dave Kodama, Bill Patterson, Alan Smallbone and Wally Pacholka!

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