SIRIUS ASTRONOMER

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OCA Board Election Nominations are still open! Election at January Meeting!

This still image was grabbed from footage taken by the HDTV onboard the KAGUYA (SELENE) spacecraft at 12:07 p.m. Japan Standard Time on November 7, 2007 then sent to the Japan Aerospace Exploration Agency's Usuda Deep Space Center. This unmanned probe is billed as the largest and most ambitious lunar mission since the Apollo era.

In the image, the Moon's surface is near the South Pole, and Australia (center left) and Asia (lower right) are visible on the Earth. (credit: JAXA/NHK)

OCA CLUB MEETING

The free and open club meeting will be held Friday, December 14th at 7:30 PM in the Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. This is our annual Members' Night, so come hear what club members Chris Butler, Tim Hogle, Tim Parker, and Tom Munnecke have been up to!

Next General Meeting: January 11th

STAR PARTIES

The Anza site will be open this month on December 8th. The Black Star Canyon site will be open again on December 1st. 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, December 7th (and next month on January 4th) at the Centennial Heritage Museum at 3101 West Harvard Street in Santa Ana.
GOTO SIG: TBA (contact coordinator for details)
Astrophysics SIG: Nov. 16th, Jan. 18th
Astro-Imagers SIG: Dec. 18th, Jan. 15th
EOA SIG: Dec. 26th, Jan. 23rd
Dark Sky SIG: TBA (contact coordinator for details)

President's Message

By Barbara Toy

This is a somewhat abbreviated President's Message, as the big news is the completion of the Observatory roof, which is covered in a separate article. However, that's not the only topic of interest these days….

The Election: The ballot for the 1990 election for the OCA board is now complete, and, in addition to all of the members of the current board, who have all been very active in different club activities and a real pleasure to work with, we have three excellent additional candidates for the position of trustee, Sheryl Benedict, Leonard Vorhees and Sam Saeed. The current trustees are Tom Kucharski, Gary Schones, Steve Short, Steve Condrey, Alan Smallbone, Shelia Cassidy, and Bill Hepner.

As a brief introduction to the new candidates, Sheryl is an active member of our AstroImage group and our GoTo group, and seldom misses a general meeting or a star party at Anza. She has also regularly attended the board meetings for more than a year, so she definitely knows what she may be letting herself in for. Leonard has a planning background, and has been a real asset to the Anza Site Planning Committee in its efforts to prepare the way for development of the "Northwest Territory" on the Anza site. Sam Saeed is an active member of the AstroImage group, and regularly volunteers to make presentations to the group. He also spends a lot of time at Anza, and he and his wife, Marilyn, regularly help out with cleaning and other work in Anza house or other places on the site, and with such things as setting up and cleaning up after the annual Starbecues and other events.

It's really great to have such a good group of people to choose from for the next board! You should find candidate statements elsewhere in this issue, and we plan to post them on the website, as well. I hope you'll all take some time to get to know the candidates a bit – and please be sure to get your ballots in by the end of the January general meeting!

Anza House Roof: This has been in serious need of replacement for a couple years now. Anza House is actually two double-white coaches that were joined. The western coach has a relatively flat metal roof while the eastern coach has a peaked roof with asphalt shingles. Both roofs have problems, and the board has approved a plan proposed by Gary Schones, and accepted an estimate to build up the roof over the western coach to match that on the eastern coach, and put asphalt shingles over both sections. This includes adding insulation to the roof over the western coach, which should help with both heating and cooling. The house is used by almost everyone who goes out to the Anza site and we will all benefit by having a roof on the house that is no longer a set of leaks waiting to happen whenever there is any significant rain. We are having the work done by a contractor so we can get it done before the next rainy season, and have allocated $9,000 for the project. We do need to do this as soon as possible, but the drain on the reserves definitely makes Charlie uneasy – any contributions any of you can make to help with this expense will be *very* much appreciated!

Anza Locks – Update: We had to move the time when the combinations at Anza will be changed to the day after the December star party (i.e., December 9) so they haven't been changed yet. If you want to be on the list to get an email with the new combination, please email me at btoy@cox.net.

Last But Not Least – Our Next How To Use Your Telescope Class Is January 4, 2008! If you have a telescope and want some help, or would like to volunteer to help others learn how to use their telescopes, do come! This is part of our Beginners Class, and will be at 7:30 in the parking area at the back of the Centennial Heritage Museum, located at 3101 West Harvard Street in Santa Ana. See you there!

CAMPAIGN STATEMENTS - OCA 2008 BOARD ELECTION

Craig Bobchin (Candidate for OCA Vice-President)

My name is Craig Bobchin and 2008 will mark my 6th year as a member of the OCA. I'm running for the Vice president's spot again this year. During the past year, I've had the pleasure to meet and interact with a great number of our members. I've also tried to bring a wide and interesting variety of speakers to this past year's meetings. I have several ideas for more speakers this year that I am working on. I have been active in many of the club's SIGs and activities, I'm a member of the Astroimagers sig, The Go-To telescope SIG, and I participate in many outreaches and beginner classes. During my tenure as Vice President, I have also had the pleasure of using my business travel to meet and interact with other astronomy clubs across the US and spread the exposure of the club far and wide. I feel that you, the members are the club's greatest asset, and I look forward to meeting and working with as many of you as possible should you choose to re-elect me as Vice-President. In this Election year I promise a Televue Ethos in every club member's scope, an end to light pollution and and clear dark skies every night. (Just Kidding!!!!) Clear Skies and Thank You.

NOTE: These are not the only candidates running! Omission of a candidate should not be construed as anything more than real life intruding on the candidate's club responsibilities. Everyone we have running this year either has done or is capable of doing a fantastic job, so don't hesitate to show your support!

Bob Buchheim (Candidate for OCA Secretary)

2008 will mark my 23rd anniversary as a member of the OCA. This club is an energetic contributor to amateur astronomy and to the Orange County scientific and educational community, and I'm proud to have been a member of the Board of Trustees. During those years I've taken advantage of many of the opportunities that OCA offers, participated in several of our special events, and made quite a few friends. I've shared my enthusiasm for astronomy in general, and amateur research in particular. I have been the club's Secretary for three years, and I hope that I was of some help to the Trustees and the members in that role. I would be honored to continue in that position for another year. During 2008, I will endeavor to help bring our plans for further development at Anza to fruition, to get the Minutes and action items from Board meetings prepared on time, and support the ongoing activities of the Special Interest Groups.

William Hepner (candidate for OCA Trustee)

I am running for a third term of being a trustee of this fine club As before it has been a pleasure watching out for your benefits of being a member of the OCA. I have been in astronomy since 1954 and was one of the first members of the nearby Riverside Club. I've been highly interested in providing ways to educate the public and our youths in astronomy and I have participated in many of the OCA outreach events As a older member of the OCA, my main interest has been it seeing that the facilities at Anza and other venues of the OCA provide safe conditions for our members I am still pressing for a safe way to get from the football field to the Anza House. On that subject there has been improvements but more are needed Please vote for me and I will still push for ways for us to provide a safe and enjoyable OCA outing and a club that will make you proud to be a member of.

Steve Short (Candidate for OCA Trustee)

Thank you for having elected me to be on your OCA governing Board for the past three years. I have tried my best to see that our funds are spent wisely and fairly so all members benefit. In fact, we spent more than usual this year getting a new roof on the Anza Observatory (although Dave Radosevich paid for much of it), spent money on the new Anza pad & observatory area and have allocated money for a new roof on the Anza house. I am very proud to represent each and every one of you and I am always open for suggestions. You won't see me out at Anza often as I try to help out at the Mt. Palomar ETS (Explore the Stars) events on those nights and must run the Black Star Canyon star parties for our club. But I am in tune with all the Anza activity and continue to support the new development of pads and observatories along with maintenance and improvements for our existing equipment, including the Kuhn telescope and observatory. You will also see me at various public outreach events, when my schedule permits and I help out at the Beginners and Astrophysics classes. I have attended some of the AstroImagers meetings so am familiar with those members and that side of the club. I would be honored if you would elect me to a fourth term so I can continue to help guide the club down a path of growth and improvements. I am particularly interested to see that club membership grows and member satisfaction remains high. Thank you for your vote of confidence!

Len Vorhis (Candidate for OCA Trustee)

My name is Leonard (Len) Vorhis. I have been interested in astronomy since 1967 when I was ten years old. I bought my first telescope with money I had earned. I have belonged to six astronomy interest groups during the last 25 years. I have conducted or participated in many public outreach events in the last 15 years. I have been involved with fabricating telescope optics for ten years. I have been a member of OCA for seven years. I have worked as a building inspector for the City of Los Angeles. I have been able to use that experience as a team member of the Anza Site Planning Committee. My specific interests for Anza are continuing to develop capital assets for the Anza site. This includes continued research of the possible placement of a large research grade telescope on site. In a position of trustee I will have more opportunities to work for the club. As a trustee I will promise to work for the club members. I would appreciate your vote for a position as trustee.

Alan Smallbone (Candidate for OCA Trustee)

My name is Alan Smallbone and I am running again for a trustee position. I have served the club as a trustee for the last two years and attended every board meeting. I am active in the club, frequently out at Anza and active in the AstroImage SIG, among other groups. I did one of the presentations at AstroImage 2006, and helped organize the AstroImage SIG's Bootcamp program to help new imagers learn the necessary techniques more easily. I hope to continue serving the club as a trustee and as a member of the Anza Site Committee. I feel that my background and skills can be beneficial to the club, and I hope to give back to the club with my contributions as a board member, and work to improve the club for the members. Thanks for your continuing trust and support.

Steve Condrey (Candidate for OCA Trustee)

First of all, I'd like to thank you, the members, for giving me the honor to serve on the Board of Trustees for two terms now. I've been a member for 13 years, editor of the Sirius Astronomer for four years, and Anza House Coordinator and an OCA Trustee for two years. In that time I've always been attentive to the needs of the membership and have done my best to present them to the Board for consideration. Among other things, I helped revise the election procedure to ensure that every member is able to vote in the Board elections in a timely fashion by moving the nominations up to November. In my role as Anza House Coordinator, I've been proactivein bringing concerns regarding this very valuable club asset to the attention of the board, and like my friend and colleague Mr. Hepner have a personal interest in improving handicapped access throughout the Anza observing site. If elected for a third term, I will continue to pursue this project, and any other concerns that you bring to me. My ear is always open, so don't hesitate to let me know what you think!

AstroSpace Update

December 2007
Gathered by Don Lynn from NASA and other sources

Adaptive optics – Based on a Caltech press release, this column in October reported that scientists had developed for the Palomar 200-inch telescope the first adaptive optics system that works in visible light, rather than in infrared, like other adaptive optics systems. Alert reader Don Nicholson pointed out that an adaptive optics system used on the Mt. Wilson 100-inch telescope achieved the theoretical limit of resolution (diffraction limited) for that telescope using visible light some years ago. That system achieved resolution a little better than the Hubble Space Telescope, and took the best images ever made of the asteroid Vesta. So the new system on the 200-inch telescope was at least the second successful adaptive optics system in visible light. I and Caltech stand corrected.

Extrasolar planet – Astronomers announced the discovery of a record 5th planet orbiting another star. It is located 41 light-years away, and is orbiting the star 55 Cancri. The star has nearly the same mass and age as our Sun. The planet was detected using the Doppler technique, in which a planet's gravitational tug is detected by the wobble it produces in the parent star. The newly discovered planet has a mass about 45 times the mass of Earth and may be similar to Saturn in composition and appearance. It's year is 260 Earth days, and it lies in the "habitable zone", where temperatures allow liquid water. It orbits slightly closer to its star than Earth does to the Sun, but its star is a little cooler than the Sun, moving the habitable zone somewhat closer. The planet is probably a gas giant, so would have no surface where liquid water could exist. But if it is like gas giants in our solar system, it may have giant moons where water could exist. The discovery was announced by Fischer and Marcy, members of the team that has found the majority of extrasolar planets. Over 320 measurements of the star were made over 18 years before the 5th planet became apparent. Those observations were made at Lick Observatory in California and the Keck Telescopes in Hawaii. The planetary system consists of: 1) a planet about the size of Neptune, but 1000 times closer to its star than Neptune is to the Sun, 2) a planet a little smaller than Jupiter, but over 40 times closer, 3) a Saturn-sized planet, but over 40 times closer, 4) the newly discovered planet, and 5) a giant 4 times the mass of Jupiter, and slightly farther. The last planet is the farthest known Jupiter-like planet from its star. All orbits are nearly circular, like our solar system.

More extrasolar planets – The WASP (Wide Area Search for Planets) team has announced discovery of 3 extrasolar planets, by searching for the dimming of starlight caused by planets transiting (passing in front of) the stars. Since this is a rare event, millions of stars must be watched to find a few planets. All 3 planets are similar in mass to Jupiter, but orbiting quite close to their stars, as are most planets found by this method. All 3 have years (period of orbiting their star) of less than 2 Earth days.

White dwarf collision – Astronomers have found that a supernova discovered last year (named 2006gz) was caused by 2 colliding white dwarf stars. Only one other such supernova has been seen, but the new one was better observed, so more evidence exists for it being a white dwarf collision. The supernova was at first classified as a Type Ia, where gas falls on a white dwarf star from a very nearby star, until it reaches the critical mass for a supernova explosion. This classification was made on the basis of lack of hydrogen in the spectrum. But it was too bright, showed the strongest spectral signature of carbon ever seen, and showed evidence of compressed layers of silicon, all of which are uncharacteristic of a Type Ia, but were predicted for white dwarf collisions. Type Ia supernovas are used to determine the scale of the Universe because their brightness is so predictable. Care must be taken in the future to eliminate white dwarf collision supernovas from any distance-scale studies, since they are too bright, and throw off the calculations.

Most massive stellar black hole – Astronomers announced October 17 that they have located in the M33 galaxy an exceptionally massive black hole in orbit around a huge companion star. Observations were made with the Chandra orbiting X-ray observatory and the Gemini Telescope in Hawaii. Black holes come in 2 types, those created by a collapsing star, termed stellar-mass black holes, and those in the centers of galaxies, often millions of times more massive, termed supermassive black holes. At 15.7 times the mass of the Sun, this newly discovered black hole is the most massive stellar-mass black hole known. The discovery raises questions about how such a large mass could result from the supernova collapse of a star. Massive stars have been observed to throw off huge quantities of material before they collapse, and the resulting supernova throws off more. It has been calculated that no more than 15 solar masses should remain after collapse. This black hole indicates there exists some mechanism that sometimes prevents some of the mass from being thrown off. Another problem with this black hole is that the size of the star just before collapse would have to have been so large that it hit its companion star. More observations of massive stellar black holes are needed. Fortunately in this respect, this record for mass lasted only 13 days.

Yet more massive stellar black hole – On October 30, another team of astronomers announced the discovery of a stellar-mass black hole whose mass is somewhere between 24 and 33 times the mass of the Sun. It lies in the dwarf galaxy IC 10, about 1.8 million light-years away, in Cassiopeia. The companion star is dumping material into the black hole, producing lots of X-rays from the accretion disk thus formed, which is how the Chandra X-ray observatory came to notice the object. Sharp changes in brightness indicated that a companion star was eclipsing the accretion disk. Follow up observations with the Swift gamma-ray spacecraft confirmed this. Future observations in visible light should help to better pin down the mass of the black hole. The host galaxy is deficient in heavier elements (consists of mostly hydrogen and helium), and it is theorized that this may change the behavior of massive stars so that they do not throw off so much mass before they collapse. It has been calculated that the material dumped by the companion star after the black hole formed could add no more than 1 or 2 solar masses, so somehow at least 22 solar masses survived the supernova and previous expulsions of mass. The star probably had at least 60 times the mass of the Sun early in its life, long before collapsing.

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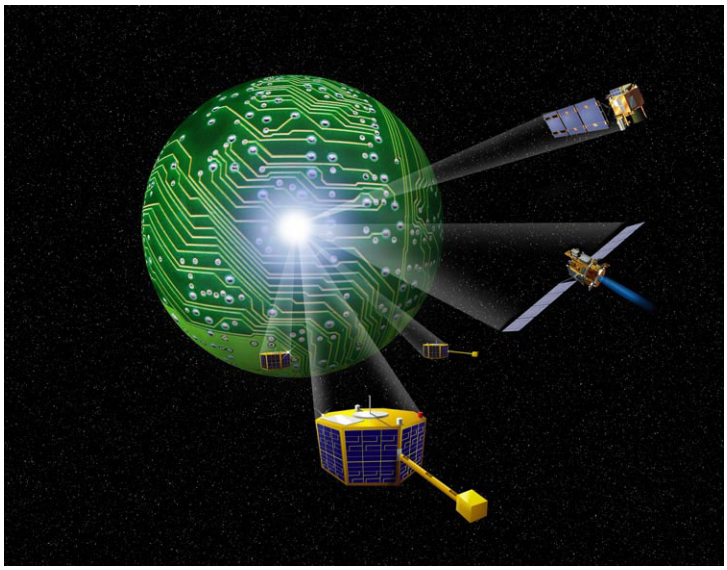
Going My Way?

Not many endeavors require that you plan the mode of transportation before you even know what it is you are transporting. But weighing the physics and economics of getting any sort of cargo to space is a major part of designing a space mission.

It's one of the first issues that NASA's New Millennium Program (NMP) considers when planning a new mission. NMP has the forward-looking job to identify promising new technologies for space exploration. It then helps to mature the technology so it will be available to space missions of the future. If the technology cannot be tested adequately on Earth, the last part of this process is to actually send the technology into space. With carefully documented test results, future mission planners can confidently incorporate the new technology into their designs.

But where to begin? On call from the start, Linda Herrell is the New Millennium Program Architect. Given a list of proposed technologies, she has the job of figuring out the feasibility of wrapping a mission around them.

"We might be considering six or more technologies, anything from solar panels to imagers to masts for solar sails to more intelligent software. Of those, we may choose four. My job is to answer the question—can the selected technology be transported to and operated in space within the constraints of a low-cost technology validation project?"



NASA's New Millennium Program selects breakthrough technologies that will be of the greatest use to future space and Earth science missions and that are perceived to be risky to the first user.

Along with the list of possible mission payloads (the technologies), Linda also has a list of spacecraft to put them on, as well as a list of launch vehicle parameters. *All* she has to do is try them out in every possible combination (of which there are thousands) and see what might work.

"Fortunately, we have a software tool to help with this analysis," says Linda. When it comes down to it, her job is primarily to figure out how to get the technologies into space.

"Sometimes, it's like figuring out how to get across town when you don't have your own car. You have to get creative."

She keeps a database of all possible options, including riding piggyback on another spacecraft, hitching a ride on a launch vehicle as a secondary payload, or sharing a launch vehicle with other NASA, Department of Defense, or even commercial payloads.

Her assessment is but one of a gazillion factors to be considered in planning a mission, but it is indeed one of the very first "details" that forms the foundation for the rest of the mission.

Find out some of the technologies that NMP has already validated or is considering at nmp.nasa.gov/TECHNOLOGY/innovative-tech.html. Kids will enjoy watching Linda's cartoon alter-ego talk about her job at spaceplace.nasa.gov/en/kids/live .

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

Building The Observatory Roof

From Accounts of the Project by Dave Radosevich

Edited, with additional comments, by Barbara Toy

As those of you who've been out to Anza in the last month probably noticed – the changes to the observatory are hard to miss – the new moving roof was essentially finished and in service by the time of the star party on November 10th. Dave Radosevich was the main person responsible for organizing and directing the project, and was the driving force that brought everything together and made it happen. In addition to all of his hard work and the creativity he brought to the project, he generously donated $4000 toward the cost, which meant that the club hasn't had to bear the full expense of this major improvement to one of our most important assets.

Jim Hannum and John Kerns, who share the house across the street from the club's Anza property with Dave, were also exceedingly important to the project. Among many other contributions, Jim did a lot of the welding and John did a lot of the painting, but that just scratches the surface of what they did throughout the construction. Their time out at Anza for all three of them has been dominated by this project for most of the last year, and the three of them built major components of the new roof in the shed on their property and stored them there until they were ready to start the final assembly.

Dave Radosevich (on ladder) and Jim Hannum (on roof) install flashing on the roof

Paul Brewer, another long-time club member and former Board member, also devoted a lot of his time out at Anza to this project over the full time of the construction, and there were others who helped on occasion as the components were assembled. The final assembly of the new roof and removal of the old one were first set in early October, but the date had to be moved because some of the parts were delayed. As the weekend of October 20-21 approached, everything was finally ready to go.

This is from the account Dave sent to the Board on October 29, after most of the construction was done:

Friday. Oct 19th: John Kerns and I removed the asphalt shingles from the [old] roof. Dumpster delivered and forklift arrived.

Saturday, Oct 20th: Finished removing shingles. Paul Brewer arrived. So did the wind!

Sunday, Oct 21st : Mike Berry (brother-in-law), Pat Walters (co-worker), Matt Ota, Tim Hogle, Ray Stan, Don Lynn, Gary Schones, Bobby Watanabe (friend), Bob Twardy and son, and Jim Hannum showed up for the fun. While wind was blowing, we managed to frame the new roof and move the old one out of the way by noon. After lunch, Bobby and I took over the removal. Old roof was off and in the dumpster in less than three hours! By dark, the old roof was gone and the new roof framed. Then the 50+ mile per hour winds kicked in. We were all very happy with the installations and removal. But....

Monday, Oct 23rd: I sent the whole team home! Winds became unmanageable and we canceled work. We were to resume on Wednesday but.... On Monday, I had loaded the 1200lbs of asphalt shingles [from the old roof] into my brother-in-law's truck. We went to the dump and talked the guy into letting us dump them. I got home around 4ish. I felt bad and had a new pain in my lower back… I spent the next 8 hours at Fountain Valley Hospital with a kidney stone! Not to mention that the over 60 stitches that I had just prior to starting this project hurt! I was and still am [as of Oct. 29] in pain. Stone has not passed as yet!

Tuesday, Oct 24th: No work. Fires started to affect area. I was in a lot of pain and also recovering from a reaction to medication!

Wednesday, Oct 25th: Jim Hannum and Gary Schones welded the roof. All of it! Don Lynn showed up that evening. They started sheeting. Gary left that evening.

Thursday, Oct 26th: Tim Hogle showed up to join in. Team managed to get most of the sheeting done.

Friday, Oct 27th: Still in pain, I could not make it out [to Anza]. Stitches removed from my face. Sheeting completed and the south flap welding started. Jim managed to get it welded but quit late and had to go home. So did Tim Hogle. Dumpster filled and removed.

Saturday, Oct 28th: I showed up along with Paul Brewer and John Kerns. We put the south wall flap together and installed it with Don Lynn. Sheeting was finished and old south flap was cut up and disposed of. Don had to leave, so Paul, John and I were to finish up. We cleaned the tools and observatory. I shot the Comet [Holmes] and posted it on the website.

Sunday, Oct 29th: We finished up the cleaning and delivered the furniture back to the observatory [Dave, Jim and John allowed us to store most of the observatory furniture in their shed during the work].

Currently [on Oct. 29], the observatory roof is 90% complete but not operational. We need to apply flashing and seal up some

areas. The motor assembly [for the chain drive] needs rework. Track needs extending. We plan to be back out this Friday to finish…

Summary: That first Sunday was remarkable. Out of the 10 folks that helped, 4 where not OCA members.... If the winds and fire hadn't come, we would have been done Wednesday. My surgeries where painful not to mention the stone so I was not 100% but Tim Hogle, Don Lynn, Gary Schones and. of course, Jim Hannum really stepped in in my absence. The local fires almost canceled Wednesday. Too much smoke in the area! I have about 300 pictures… You cannot believe the change it has made to the inside of the observatory! And, yes, the last day it rained!

As you might have gathered from Dave's account, the week of the construction also happened to be the week of the major winds and firestorms throughout Southern California. The closest fire to Anza was near the intersection of SR 79 and SR 371; it was put out fairly quickly, but the road was closed for several hours and people had to take other routes to leave the Anza area. Even though none of the other fires was very close, I'm told that the smoke was so thick at our site at times that it was difficult to see from one side of the observatory to the other. Needless to say, breathing was also difficult!

The last of the old roof is lifted off of the observatory structure. The framework for the new roof can be seen in the background.

I'd had my own health issues while this was going on, which, to my regret, meant I wasn't in any condition to help out beyond making sure the observatory was cleared out and everything removable was taken off the Kuhn in preparation for the construction. When I was able to make it out to Anza on November 3, I was amazed at what they had accomplished. The new roof itself was truly impressive, even though there was still a lot of finishing that needed to be done, but what was equally remarkable was the lack of major construction debris anywhere around the observatory. Dave and Company ran a very clean construction site!

After that visit, Dave sent the following account of their further activities that weekend:

We were able to mostly finish up the roof (happy to report). Flashings are on and it appears to be water tight. Jim [Hannum] and I will be out Saturday to hook up the motor and pull the roof off for the first time. We moved it back by hand about 1/2 way and noticed some issues with the track. We think we know what to do but it will take most of [next] Friday (Jim) and Saturday. We cleaned up the observatory so it's ready for the electronics to come back in after about 4ish on Saturday…. Roof looks much better than when you saw it Saturday afternoon. Spent most of Sunday installing the flashing…

As Observatory custodian, I am particularly grateful to Dave and his crew for this wonderful modification to the observatory, which already is making it more usable. The working lights attached to the new roof are much more convenient to use than the old ones, and we have already put them to use when working in the observatory with the roof closed. Once we got the computers hooked back up to the Kuhn (my thanks to Dave and Jim for their help with this!), we were able to move the Kuhn around a lot with the roof closed, something we couldn't do at all with the old roof; this will make working on the telescope much easier than before. The new south roof flap is much easier to open and close than the old one, and is more secure when it is closed as it locks in place instead of merely being held by a rope on a cleat. And, because the roof is lighter than before, they modified the chain drive (I believe this was Jim Hannum's excellent idea), so the roof now can be opened and closed much faster than before – the thumbs of all of us who regularly open and close the Observatory will truly appreciate this change! (For those who have not had that experience, I will merely note that the button you have to press continuously to keep the chain drive moving is quite stiff.)

The new roof and the Kuhn worked flawlessly for the star party on November 10. Pat Knoll came out to Anza on November 3rd and 10th to help me get the Kuhn back into full working order, and was able to spend some time imaging Stephan's Quintet before people started showing up for viewing. We were quite busy with visitors in the observatory during the star party, and there was a lot of interest in the new roof. Even though there are still a number of things that need to be finished as I write this, we're definitely back in operation, and the new roof is a real pleasure to use. And, as an added bonus – Dave made a metal box to enclose the big RA gear that sits near the floor at the back of the telescope mount, so we no longer need to have a ladder blocking access to that area to make sure people don't get caught in the gear.

Many thanks to Dave, Jim and John, and everyone else who helped on this project!

The new roof, partly opened. The bar with the counter-weight on it at the top of the observatory wall on the right side of the picture helps control the new south wall flap.

Comet 17/P Holmes taken by Jaime Flores on 11/10/07

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Missing black holes found – Most nearby galaxies have been found to have supermassive black holes at their centers. But surveys of distant galaxies have failed to find similar percentages of galaxies with black holes. This has been called the missing black hole problem. A new study of galaxies so far that the light left there 9 to 11 billion years ago, made by the Spitzer orbiting infrared telescope and the Chandra X-ray observatory has found hundreds of supermassive black holes that would not be visible in other wavelengths of light due to dust blocking the light. This represented a large fraction of the black holes calculated to be missing in the galaxies studied. So it is likely that the black holes are not missing in the early Universe, but simply were more obscured by dust. This result suggests that collisions between galaxies might not play as large a role in galaxy evolution as previously believed. Some theorists had claimed that in the early Universe, we were seeing only the supermassive black holes that were being fed large amounts of material from colliding galaxies. But the numbers of galaxies seen in the new study exceeds the contribution predicted from collisions.

Black hole winds – It has been known for some time that the supermassive black holes found at the centers of most galaxies create winds of material blowing far out into or beyond the galaxies. It is theorized that the wind is produced by the spinning accretion disk of material that is on its way to falling into the black hole. Study of the winds in a galaxy about 3 billion light-years away has for the first time observed the wind rotating at the same speed as the accretion disk, supporting the theory. It also supports the theory that accretion disks throw away rotational speed through their wind, allowing remaining material in the disk to fall out of orbit, and into the black hole. The new observations were made with polarized light, yielding more information on the winds than previous observations.

FUSE (far [short wavelength] ultraviolet space spectrograph) – The demise of the FUSE spacecraft was reported here last month. Here are more of the important discoveries made by FUSE during its 8-year life. By measuring abundances of molecular hydrogen, it showed that a large amount of water has escaped from Mars, enough to form a global ocean 100 feet deep. FUSE found surprisingly rich amounts of carbon gas orbiting in the debris disk of the star Beta Pictoris. The overabundance indicates either the star is forming carbon-rich worlds of graphite and methane, or else there is a carbon-rich phase in normal planet formation. FUSE discovered far more deuterium, hydrogen with an extra neutron, in the Milky Way galaxy than astronomers had expected. Deuterium was produced soon after the Big Bang, but is destroyed easily in nuclear reactions in stars. The FUSE observation showed less deuterium has been destroyed in stars than thought, agreeing better with another recent observation by the WMAP spacecraft. By detecting highly ionized oxygen atoms in intergalactic space, FUSE showed that about 10 percent of matter in the nearby universe consists of million-degree gas floating between the galaxies. This helps explain the baryonic (proton and neutron) part of the missing mass problem. The remaining baryonic missing mass could be even hotter gas than what FUSE detected, which future spacecraft may be able to see.

(continued on page 10)

HAS YOUR INTEREST IN ASTRONOMY
COME TO THE POINT WHERE
YOU'RE THINKING IT
MIGHT BECOME A HOBBY?

The OCA is now starting a "Beginners Forum" before the monthly meetings at 7pm-7:20pm in the foyer. It will be a place for you to ask questions about Astronomy as a hobby, equipment, sources for viewing of objects or even questions about the club. An experienced club member will be in attendance to answer your questions.

NOTICE: All submissions, including ads, to the Sirius Astronomer should now be submitted to stevecondrey@verizon.net. To avoid unnecessary delays or unfortunate but well-meaning efforts by the editor's spam killer, please include the notation [SA] in the subject line of all messages regarding the newsletter.

FOR SALE: 8 inch Celestron NexStar. Brand new - never used. $900.00 Contact: Ken Duvall (714) 240-2993

2-inch new (not used) eyepieces from Surplus Shed. One is 10 mm focal length for $40; the other is 38 mm focal length fo $60; these only fit 2 inch focusers. Also selling 2 different new (in box) green laser pointers, one with constant on switch (just like a flashlight) for $135, the other with a momentary switch (release and it goes off) for $80. These are both 4 times as bright as the pointers commonly seen. Ph: 909-861-6461 or email scopeguy20@gmail.com

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FOR SALE: Celestron CR 150hd Dual Axis Drive CG5 Mount. New motors and hand controller; roll-about hard case. Nice condition. $750.00
Meade LXD55 8 inch Schmidt Newtonion. Recent complete service by Meade, new Autostar, etc. Roll-about hard case. Nice condition. $800.00
Contact Steve Bird 562 234-2157

FOR SALE: Meade 8-inch LX200 GPS w/all factory accessories; aluminum channel tripod w/pneumatic tires. Contact Bob Krause at 949-248-3111

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(continued from page 10)

Mars Express's radar system has uncovered new details about mysterious deposits on Mars known as the Medusae Fossae Formation. It has provided the first direct measurements of the depth and electrical properties of the materials. They are found near the Martian equator along a divide between highlands and lowlands, and may be some of the youngest deposits on the planet, since there is a marked lack of impact craters there. The deposits are move than 1.4 miles thick in places. The electrical properties indicate probable fluffy material or icy material. The latter is more likely since fluffy material could not withstand the weight of such thick deposits. However, there is no other strong evidence of thick icy materials anywhere near the equator. The best theories as to the formation of the deposits were volcanic ash, wind-blown material dropped there, or icy layers formed long ago when the planet's pole was close to this area. Interpretation of these observations may rule out some of these. More observations are needed.

Ulysses (mission over Sun's poles) has now flown through its 3rd comet tail. The first was comet Hyakutake in 1996, a surprise, since the spacecraft was far beyond the visible tail. Ulysses is apparently far more sensitive to particles and magnetic fields of the tail than visible light observations are. That observation set the record for longest comet tail observed. In 2004 it happened again, with comet McNaught-Hartley. This time Ulysses was not even in the tail direction, but a chance eruption of particles from the Sun blew the tail to the spacecraft. The 3rd time occurred earlier this year with comet McNaught (different comet, same discoverer). Ulysses was launched 17 years ago, and keeps surprising astronomers.

Space Shuttle Discovery completed its 15-day mission (STS-120) to the International Space Station, in spite of some major unexpected issues. The plan was to add the Harmony (also called Node 2) module to the station, which is key to attaching the 2 space lab modules (supplied by Europe and Japan) scheduled for launch in the next few months. This went smoothly. Next the plan called for moving solar arrays, while folded, to their permanent locations at the end of the station, beyond where future modules are going, and then unfolding the arrays to their operating positions. The previous mission that folded up the arrays had some trouble with solar panels snagging on frayed guide wires, but the unfolding on this mission was worse. Guide wires wadded up and the solar panels hung on them and ripped while extending. Another spacewalk was scheduled, with hastily made plans, using tools triply wrapped with electrical tape (for working next to the approximately 100 volts in the solar arrays), with the astronaut on the end of the shuttle inspection boom, which was itself held at the end of the station mechanical arm. Scott Parazynski, the repairman-astronaut, was formerly an emergency room physician, and is one of the most experienced spacewalkers. The operation was entirely successful in patching and extending the solar arrays, but one pair of pliers escaped and is now in Earth orbit. This spacewalk was after the 3 planned ones that it took to get a truss section and the solar panels moved down to the end of the station. A problem discovered during the spacewalks, involving metallic debris (indicating possible part failure) in a hub that rotates one section of the solar panels, was carefully documented so that a fix can be made on a future mission. Until this problem is fixed, the right-side solar panels will be locked in position, or at least moved minimally, rather than turning toward the Sun, reducing their output. The left-side arrays were locked in one position until the spacewalk repaired the torn array. The repair spacewalk was the 96th one devoted to space station assembly and maintenance since assembly began 9 years ago.

International Space Station (ISS) – In July this column reported briefly on problems with the ISS computers that control navigation and oxygen generation. The initial report at that time was that spiky power from new electrical equipment probably caused the computers to shut down. After the investigation, it became apparent that was wrong. Here's the real story. All 3 supposedly independent and redundant computers controlling the maneuvering of the station and the oxygen system did indeed shut down, and could not be restarted consistently. Blaming it on the power system was just a guess by the Russian developers of the computer systems. The problem was stopped, even though not understood at the time, by attaching jumper wires to bypass the device that detects spikes in the power. It seemed like the guess might have been right. Yet continued testing of all parts did not find the exact cause. The residents of ISS then removed and inspected every part of the power system and the computer systems, and found the real problem. Cables between the components were found to be wet and corroded at the connecting pins. The system was designed to keep the cables warm enough to prevent water from condensing out of the air, but broken dehumidifiers allowed conditions that the warming system could not cope with. So it essentially rained inside some of the cabinets, soaking components. One of the worst findings was that the triple redundant system that was supposed to prevent any two failures from causing loss of station control or oxygen, was mistakenly designed with only one power spike detector, capable of shutting down all 3 systems. A lot of lessons were hopefully learned from this experience, not the least of which is that the Russians and Americans need to stop blaming the other guys and cooperate on finding solutions.

Chang'e 1 (Chinese lunar mission) launched in late October, raised its orbit to reach the Moon in steps, went into lunar orbit, and in steps lowered and circularized its orbit to where observations are to be made. This is China's first lunar mission, is planned to observe for a year, and was named after a legendary goddess who flew to the Moon. In an unusual move for the Chinese space program, officials opened the normally off-limits space center to guests who purchased tickets to view the launch, and the launch was broadcast live on television. The mission will create a 3-dimensional map of the lunar surface using stereo imaging and a laser altimeter. It will also study the distribution of minerals and chemical compounds with spectrometers in infrared, gamma rays and X-rays. China has announced this mission will be followed in 5 years by a lunar rover, and in 10 years by a sample return mission.

Instant AstroSpace Updates

Chandra (X-ray observatory) has observed a relatively nearby **supernova** remnant in the Milky Way and was able to see material thrown off before the supernova after, showing that the rotation axis of the star was unchanged by the explosion. It also found that the star was kicked by the explosion so that it is speeding out of the remnant, in a direction not aligned with the spin (contrary to some theories).

A study of the asteroid **Apophis**, which is going to make 2 close passes by Earth in 2029 and 7 years later, has matched its spectrum with that of a rare type of meteorite known as LL chondrite. Laboratory study of such meteorites tells us what this asteroid consists of. ■

Open Letter from Brian Hart

[Editor's Note: for those who are unfamiliar with Mr. Hart, he has been very active in OCA in the past, both serving as a speaker and helping the club to secure speakers for the monthly meetings.]

Dear Orange County Astronomers members:

My name is Brian Hart, and as you know I am one of the Astrophysics Ph.D. Candidates at UC Irvine. I work on X-ray observations of galaxy clusters with the Chandra X-Ray Observatory. I am sorry I couldn't be with you tonight, however I am at UCI, preparing my dissertation for evaluation by the committee. My defense is scheduled for December 20, and I want to make sure I am working hard with as much focus as I can bring to bear. My thesis is titled "Evolution of Substructure in Galaxy Clusters as Seen in X-rays." After defending, I plan to join the Air Force as an officer. I have always wanted to first educate myself, and then give that education to my country. The Air Force wants to make me a Program Manager with the rank of Captain upon entering, and I will be in charge of setting the vision for the Nation's newest space programs, some of which haven't been conceived of yet.

I hope I can speak to the club about my dissertation presentation as a 'practice go' perhaps at a members' night or AstroPhysics SIG meeting. Please wish me well as I make this final push towards the Ph.D. in Astrophysics and that I get accepted into the Air Force, for which I am still in the applications process. I will hear in early December, and I will keep you all posted. If accepted and sworn in, my posting will likely take me away from Orange County, perhaps permanently. I hope to be with you all again soon to say farewell. After about three years or so professional experience, my plans are to apply to NASA's Astronaut Candidacy Program and contribute what I can to the International Space Station project and any other space programs. My ultimate vision is to contribute to the development of interstellar space travel through a blending of advanced astrophysics and aerospace engineering.

I want to really acknowledge the Orange County Astronomers, as I found you just as I was getting seriously burned out for astronomy, and your collective enthusiasm and love for astronomy as a hobby and your passion for exploring the Universe brought me back to enthusiasm. Astronomy & astrophysics are the sciences for which I have had an enthusiasm for since I was 10 years old in 1990 and picked up Terrence Dickison's children's book, "Exploring the Night Sky" randomly while walking through a bookstore. Thank you all, and wish me luck as I embark on the voyage of discovery. It is my hope to take you all along with me some day.

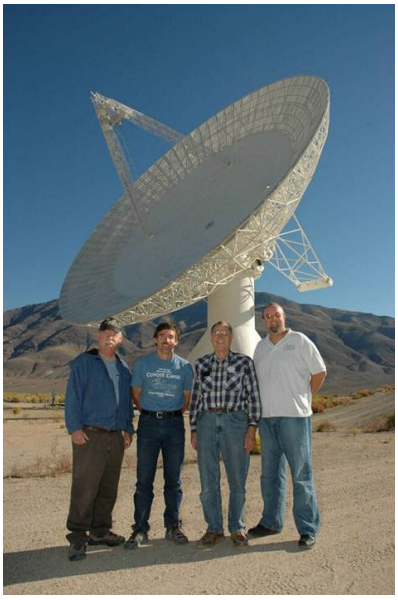
Brian C. Hart

Ph.D. Candidate

UC Irvine Center for Cosmology

Astrophysics Group

Department of Physics and Astronomy ■



Owens Valley Radio Observatory Tour

by Doug Millar

I am planning a trip to the Owens Valley Radio Observatory on Dec 27-28th. We will carpool up on Thursday and come back on Friday. We will have a tour of the site, some science demonstrations and an opportunity to do night time astronomy. We will stay at the Bristlecone Pine Motel in Big Pine. The trip is for children as well. There are also lots of other activities. Most of the trip is along highway 395 through Mojave and Lone Pine. There is lots to see and do, including playing in the snow near Big Pine. Check my website at K6JEY.com to see what is going on. If you would like to go please contact me. at this email or 562-810- 3989 and I will pass along more information.

■

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