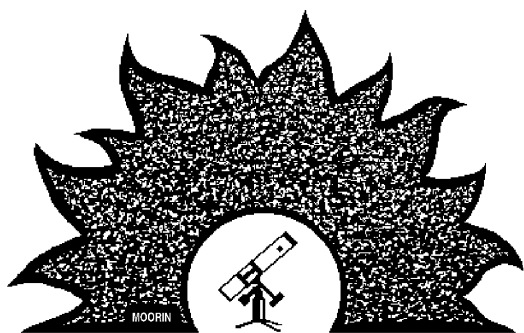




PAStimes

Newsletter of the
Phoenix Astronomical Society
www.pasaz.org

September 2005
Volume 58, Issue 1

PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Next Meeting: Thursday, September 1st

The Phoenix Astronomical Society has a new meeting venue. At the July 28th Meeting of the Minds a quorum of our membership voted to move our meetings from Foothills Academy to Paradise Valley Community College. The vote, decided by 14 members in attendance, was unanimous. The move was prompted by three factors: PVCC needed the affiliation to increase interest in their student astronomy club; PVCC was willing to provide, at no charge, their Library and Physics Lab (with full multimedia support) for our meetings; several PAS members had expressed dissatisfaction with the far-north location of our current venue. A map to our new meeting location is provided in this newsletter.

Our opening lecture for this season features Clay Thompson, famous for his long-running Valley 101 column in the Arizona Republic. Thompson will speak on the topic of "Being Amazed." ★

Last Meeting: Thursday, May 5th

Dennis Young provided an abbreviated presentation highlighting some of his recent finds, including some huge WWII binocs and projectable sky maps. As always, Dennis educated and entertained us with his newest astronomical toys.

As this was also our business meeting, the members present voted in our new officers for 2005-6. They are: President Terri Finch, Vice-President Matt Kohl, Treasurer Mike Marron, Editor Dan Heim, and Webmaster Barbara Hartman. Several director level positions were also assigned and approved, including Multimedia Director Don Boyd, IDA Liaison Barbara Hartman, Rocketry Liaison Jerry Belcher, and PAS Liaison Katja Petersen.

The meeting concluded with an outside observing session for Foothills science students. 30 students were in attendance to view the night sky through Dennis' 20" open truss Dobsonian. Thanks to the Sirius Looker for his contribution to this meeting! ★



View of our new meeting venue at PVCC.



Dennis Young speaking at our May 2005 meeting.



Dennis displays his monster binoculars.

September Events:

- 9/1: PAS Lecture Meeting at PVCC, 7 pm
- 9/2: Adult Night Out at ASC, Risks in the Digital Age
by Partha Dasgupta of ASU, volunteers needed
setup in Heritage Square at 6 pm
- 9/3: Deep Sky Star Party at High Desert Park in BCC,
sunset, 2\$/car donation requested
- 9/15: Public Star Party at PVCC, 7 pm
- 9/24: Public Star Party at PVCC, 7:30 pm
- 9/29: PAS Meeting of the Minds at PVCC, 7 pm
- 9/30: All Arizona Star Party (see EVAC for details)

Captain's Log:

By Terri Finch

Start planning it now. Do you have your gift chosen for the PAS Holiday Social White Dwarf Gift Exchange? Look around in the next 5 months, between now and January, and find just the right gift to give. Then, also watch for shiny paper, really brightly colored papers, bows, etc. to make your gift the most outstanding, interesting, and the most sought after gift at the exchange. You need one gift for each person involved in the gift exchange, and if you wish to purchase extras, we could use a few door prizes, the dart game prize, and other prizes we would like to give away. Make your special gift so appetizing with the special papers, add stickers, bows, make it heavy, make it interesting, make it large, or maybe very tiny. Make it so interesting that everyone wants it. Disguise it well. Then, bring it, yourself, and some food to share, and let's party!

Ideas for what gift to bring: anything Astronomy, e.g., Rockets, Planets, Comets, Asteroids, Moons, Satellites, Cosmology, Space Art, Games, Books, Posters, Stickers, Toys, Foods, Mugs, Stationary, Calendars, Jewelry, Clocks, Paintings, Aliens, Computer software, VHS, DVD, CD's, Pencils, Sundials, Space Ships, Stars, Movies, Documentaries, Solar Systems, and much more. The price range is up to you, but most gifts average around \$10 to \$20. Everyone who brings a gift, leaves with a gift. Those who do not bring gifts are not included in the game. We'd like to see everyone included in this year's White Dwarf. Bring a gift you'd like to receive.

It is also time to be thinking about that perfect gift for someone special. The Year in Space desk calendar is the perfect gift for that astronomer friend who has everything else. All year long they will remember you gave them such a wonderful gift. The new calendars will be coming out soon. We will be putting in the order again, probably around November 15th again, like we did last year. I was able to deliver

them all to everyone prior to the beginning of the year. If we get 10+ orders we can get them for around \$8.00 each. Now is the time to consider ordering your calendar. Visit the website, and then put in the order with me. The more we have in one order the more we save. Visit <http://yearinspace.com>. If you are going to be ordering the calendar, please RSVP a calendar with me soon. The deadline to receive all the checks for the calendars will be Oct 31. As soon as I know how many calendars are being ordered, I can give you the total the calendar will cost. Check it out and order with me today by RSVP for now, and later I will collect from you before I put the order in. Thanks so much. You'll love this calendar. I do. ★

BCC High Desert Park Star Party:

By Barbara Hartman

We all arrived just about 7 pm, David with his 4.5" Dobsonian, Nathan with his 6" Dobsonian, Rod and Sue with their 8" Orion EQ, me with my 10" Orion EQ, Katja and her sister Akhena, Kyle, (Rod and Sue's son) and his girlfriend Sara. Kevin with his 6" Dobsonian, arrived a little bit later. We looked at the Moon, Venus and Mercury, then Jupiter. Once it was dark enough Nathan and I tried for comet Temple1. Nathan found the correct field; the stars matched, but it was up to the viewer to see the comet. Nathan and I both think we saw hints of it. I guess my heart was not in it as I couldn't find the comet with my telescope and gave up. It was a wonderful night, clear and steady. We looked at many objects and had a great time with great company. When Mars came up we viewed it too. Most of us stayed very late; Nathan, Kevin and I were still there by dawn's early light, about 4 am we began to pack up. Nathan showed us many of the Messier objects as did Rod, who was exploring Sagittarius and Scorpius. With Nathan's help I found the Cat's Eye Nebula (C6), and I bagged 6 more Caldwell objects. Only 60 more to go for my certificate! ★

Dark Victories:

By Barbara Hartman

This is a progress report from your Dark Sky Advocate. Since being appointed to this position last year, we have had several small victories. Three of them near our deep sky star party location. Two property owners were made to comply with the dark sky ordinance by shielding dusk to dawn lighting and reducing the wattage of their lights. A new mercury vapor light was replaced by a low pressure

sodium light. I worked with Richard Guthrie to get light trespass into his yard from a nearby streetlight stopped. I also helped Sue and Rod Sutter with a troublesome bubble type streetlight. APS changed out the lamp to a full cutoff lamp and they now have a better view of the stars from their yard.

If you are experiencing light trespass from a street light near your property, call the City of Phoenix lighting request line at 602-495-5125. Leave a message with the address and street light number, and say you want the light shielded. You can also talk to Phoenix City's Christy Lufbam, a very helpful lady, at 602-371-6134.

It is the property owner that must initiate this, and APS must comply to the Dark Sky ordinance.

On the educational front; I was interviewed via phone by the Arizona Daily Star newspaper out of Tucson, the interview was a follow-up to the article "The darker, the better" They are available online at www.AZStarnet.com. ★

Interferometer Tour at NPOI Lowell Observatory

by Rod Sutter (photos by David Owings)

Sunday, August 7th, 9 am, PAS was the guest of the NPOI (Navy Prototype Optical Interferometer) up near Flagstaff, Arizona. Our tour guide, Nat, has been with Lowell Observatory since 1969. His main line of work is with cool stars, and giants. An engineer by degree, Nat's official position at Lowell is Project Manager for the Interferometer.

NPOI is the largest interferometer in the Northern Hemisphere at visual wavelengths. It is being used to obtain very accurate (astrometric) positions and detailed images of stars. The project is a collaborative effort of the U.S. Naval Observatory (USNO) and the Naval Research Laboratory (NRL) Observatory, responsible for site development and operation. The project is funded by the Office of Naval Research, Washington, D.C. The building on the right holds the 72" scope, the building in the middle is "John Scoville Hall" which houses the 42" RC.

We started our tour with the 72" Perkins Telescope that was installed in 1960. It was installed with a spectrometer, and a ccd. The spectrometer cost \$1 million. It was originally funded by a 6'7" pig farmer in Ohio. At the time it was the 3rd largest telescope in the world and was arc welded together

NPOI is actually two sub arrays of interferometers. The astrometric array, designed by USNO, consists of four flat-mirrored light collectors (sideostats) dis-



PAS members gather outside the dome at NPOI in preparation for their tour. The weather was perfect. About a dozen of our members were in attendance for a privileged inside look at NPOI.



This outside view of the NPOI facility shows the dome for the 72" Perkins scope (at right) as well as John Scoville Hall (at left) that houses the 42" RC.



Our tour guide, Nat, shows us the computer control console from which most their operations are run. Our thanks to Nat for a great inside tour of NPOI!

tributed in a “Y” configuration with 20-meter arms. The sideostats are permanently housed in insulated enclosures along with control computers and a complex laser system capable of measuring the positions of the sideostats within 100 nm.

Computer analysis of the data can provide highly accurate positions of stars (0.003 arcsec for stars brighter than 10th magnitude) and detailed images with a resolution equivalent to detecting the dimples on a golf ball at a distance of 1000 miles (0.0003 arcsec for stars brighter than 4th magnitude)!

They had a problem with vibration just after installation. They would get a bad vibration once in a while. So one day while they were in the hut removing the mirror covers. The people in the main building called them and said they just got a vibration from the one building. This went on for a while, then one day they were working in the hut and got a vibration. They finally figured out that the vibration they were getting was the big trash bin lid being opened and closed during the Interferometer calibration.

Our next stop took us to the 42” Ritchey-Chrétien telescope. This scope is 30 years old. It has a special built-in design that lets them use it as either an F8 or F16 scope. The gold tube that you can see is the Nitrogen filled tube and CCD camera. The picture on the right shows the 42” mirror that is actually two mirrors that are melted together.

Many fundamental stellar properties can be determined with NPOI, including distances, diameters, and very small motions in the plane of the sky. The separation, orbits, and masses of stars in binary systems also can be determined. Even images of star spots, flare activity, and mass exchange between stars may be detected for the first time. ★

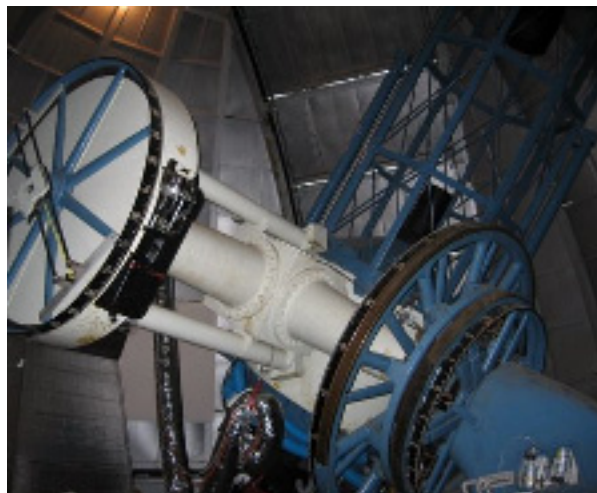
Astro Factoids

Contributed by our members and other sources

Only four 1st magnitude stars can ever be occulted by the Moon. They are Aldebaran in Taurus, Regulus in Leo, Spica in Virgo, and Antares in Scorpius. Watching the Moon pass in front of a bright star ranks among the more dramatic events visible to backyard observers. Most highly sought are those rare “grazing occultations” when the occulted object disappears and reappears between mountains and valleys along the limb of the Moon. When this happens with a 1st magnitude star the effect is even more striking. This year features occultations of two of these luminaries: Antares in Scorpius and Spica in Virgo. ★



Nat shows us the “delay line” pipes that allow them to fine tune the interference images obtained. The pipes contain a vacuum to minimize light scattering.



The large 72” Perkins telescope at NPOI, installed in 1960 and, at that time, the third largest scope on the planet. It’s still an impressive instrument today.



The photographer, David Owings, poses near the business end of big RC scope. David is one of our newest members. Welcome David! Nice shots.

Astronomy Day at ASC

by Dan Heim

Saturday, May 28th, PAS participated in the annual Astronomy Day celebration at ASC (Arizona Science Center). This is an all-day event attended by students, teachers, and the general public. All the valley astronomy clubs make a showing to promote our mutual hobby and attract new members. We hope you enjoy our photos of this year's event. ★



Mike Marron explains his latest theory on plasmas.



Katja Petersen, PAS Liaison, greets all with a smile.



Two inquisitive children experiment with Dan Heim's triple green laser optics demonstration.



Don Boyd and Barbara Hartman provide an exhibit of posters and telescopes covering multiple themes.



William and Prez Terri Finch at the main PAS table.



Disa Holly runs a quiz on naming celestial objects.



Bob Holmes, the Meteor Man, rocks on as always.

From the NASA Space Place: Improbable Bulls-Eye

by Dr. Tony Phillips

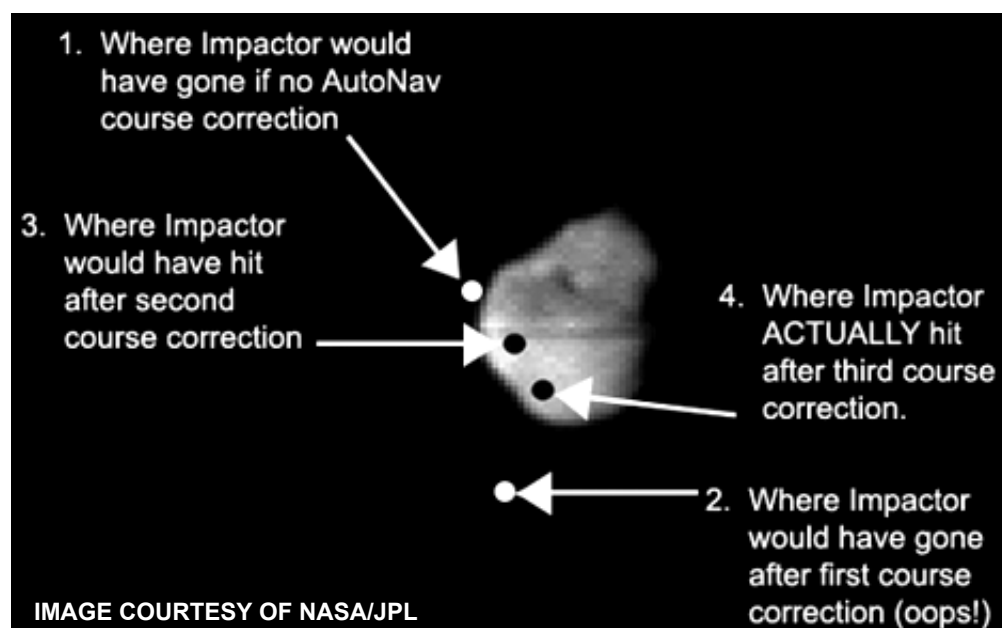
Picture this: Eighty-eight million miles from Earth, a robot spacecraft plunges into a billowing cloud almost as wide as the planet Jupiter. It looks around. Somewhere in there, among jets of gas and dust, is an icy nugget invisible to telescopes on Earth—a 23,000 mph moving target. The ship glides deeper into the cloud and jets its cargo, the “impactor.” Bulls-eye! A blinding flash, a perfect strike.

As incredible as it sounds, this really happened on the 4th of July, 2005. Gliding through the vast atmosphere of Comet Tempel 1, NASA's Deep Impact spacecraft pinpointed the comet's 3x7-mile wide nucleus and hit it with an 820-lb copper impactor. The resulting explosion gave scientists their first look beneath the crust of a comet. That's navigation. Credit the JPL navigation team. By sending commands from Earth, they guided Deep Impact within sight of the comet's core. But even greater precision would be needed to strike the comet's spinning, oddly-shaped nucleus.

On July 3rd, a day before the strike, Deep Impact released the impactor. No dumb hunk of metal, the impactor was a spaceship in its own right, with its own camera, thrusters and computer brain. Most important of all, it had “AutoNav.” AutoNav, short for Autonomous Navigation, is a computer program full of artificial intelligence. It uses a camera to see and thrusters to steer—no humans required. Keeping its “eye” on the target, AutoNav guided the impactor directly into the nucleus. The system was developed and tested on another “Deep” spacecraft: Deep Space 1, which flew to asteroid Braille in 1999 and Comet Borrelly in 2001. The mission of Deep Space 1 was to try out a dozen new technologies, among them an ion propulsion drive, advanced solar panels and AutoNav. AutoNav worked so well it was eventually installed on Deep Impact.

“Without AutoNav, the impactor would have completely missed the nucleus,” says JPL's Ed Riedel, who led the development of AutoNav on Deep Space 1 and helped colleague Dan Kubitschek implement it on Deep Impact. En route to the nucleus, AutoNav “executed three maneuvers to keep the impactor on course: 90, 35, and 12.5 minutes before impact,” says Riedel. The nearest human navigators were 14 light-minutes away (round trip) on Earth, too far and too slow to make those critical last-minute changes. Having proved itself with comets, AutoNav is ready for new challenges: moons, planets, asteroids ... wherever NASA needs an improbable bulls-eye.

Dr. Marc Rayman, project manager for Deep Space 1, describes the validation performance of AutoNav in his mission log at <http://nmp.nasa.gov/ds1/arch/mrlog13.html> (also check [mrlog24.html](http://nmp.nasa.gov/ds1/arch/mrlog24.html) and the two following). Also, for junior astronomers, the Deep Impact mission is described at <http://spaceplace.nasa.gov/en/kids/deepimpact/deepimpact.shtml>. ★





Astronomy Quote of the Month:

"I know not what I may appear to the world, but to myself I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."

— Sir Isaac Newton

From your Editor:

by Dan Heim

This is my first issue of PASTimes. I hope you like it. As Editors tend to do, I've reorganized the format to my preferences, but also used lots of feedback from other members. I thank them for their input, especially Terri who (as Editor from 1993-2005) did an outstanding job and provided me many editorial insights. Please feel free to continue this process! Tell me what you like or don't like. This is your newsletter and I'll try to keep all of you happy. Expect to see some more changes over the next few issues.

The overall content of PASTimes is more or less unchanged. We've added "Captains Log" as a regular column by our President, "Astronomy Quote of the Month" for favorite words of wisdom (send me yours), and "Astro Events" for moon phases and other astronomical highlights for the month.

We also moved the NASA Space Place article to a dedicated page to showcase the amazing images they provide. This will be the only "outside" material routinely used, as I want to focus more on what PAS does. This is not an astronomy magazine.

Other changes are cosmetic. I decided to use the Arial 10 point font for the main text, as it is readable at that size and allows for more content. Page layout will alternate between 1 and 2 columns, just for visual variety. Paragraphs will be used to enhance readability and preserve the original flow intended

by the writers. This takes up a little more room, but it's good to have some "white space" mixed in (along with standard 1" margins all around). Toner doesn't grow on trees you know. Or does it? :)

I'm going to try to keep this newsletter to 6 pages to hold down our mailing and printing costs down (we still USPS out several copies), but may go over that on occasion. Like this issue, for example, which covers May-August. If you have material you want included, send it to me, but I can't promise it will all go in. I reserve the right to edit all submissions for relevance, length, spelling, and grammar.

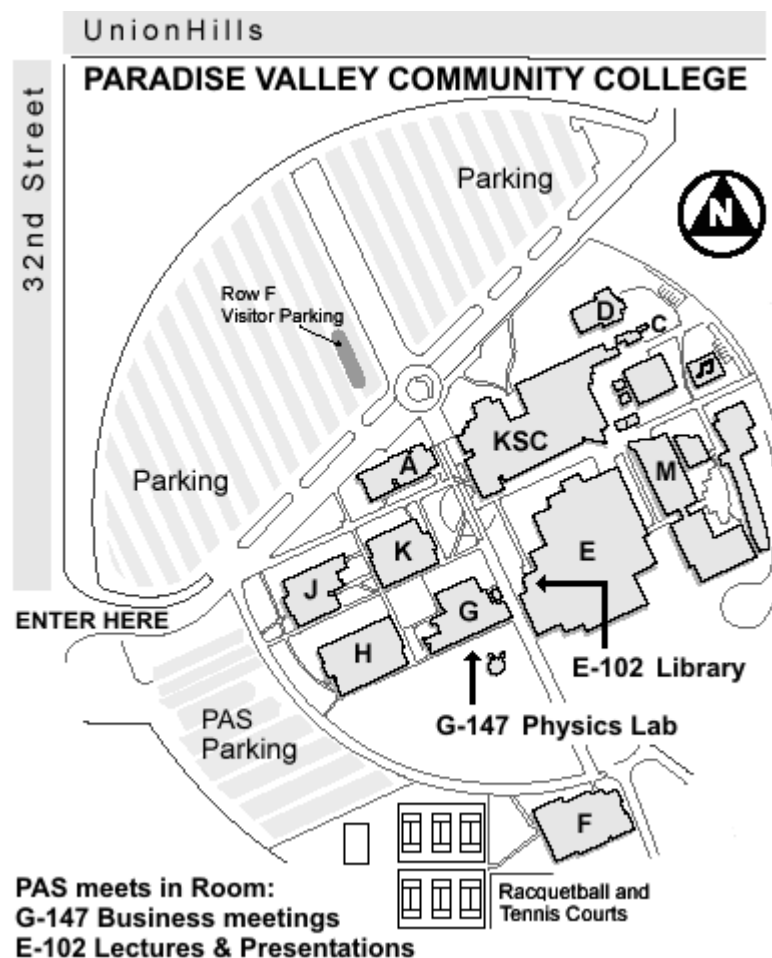
Target date for electronic posting and mailing will be one week before each scheduled Lecture Meeting. So if you don't get your stuff to me by at least a few days before that, it won't go in. Earlier is better.

Starting this season, PASTimes will be available for download from our website at: www.pasaz.org. We hope this will be more convenient for members with internet access, and less troublesome than the old Yahoo system. Let me know how it works for you.

This is more than I'll write in most issues, but since it is my first, I wanted to clarify what I'm trying to do and explain some of my choices. As I said, I'm open to your input and would be disappointed if I heard nothing. Good or bad, let me know. My job as Editor is to give you with a quality newsletter that provides the type of things you want to read.

But I intend to do it in 6±2 pages and <1Mb. ★

MAP TO OUR MEETING LOCATION



September 2005

Sunset: 6:30 pm

Sunrise: 6:15 am



NEW: Sep 3rd



Q1: Sep 11th



FULL: Sep 17th



Q3: Sep 25th

Astro Events:

Spectacular gathering of Moon, Venus, Jupiter, Spica on evening of Sep 6th.

Equinox Sep 22nd, 6:23 pm EDT

Mars rising 10 pm Sep 1 and 8:30 pm by Sep 30, is increasing in brightness and angular size. Time to start your 2005 observations. Closest approach will be Oct 30. Opposition Nov 7.

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