

"CLEAR SKIES"



NEWSLETTER of the CHAMPAIGN-URBANA ASTRONOMICAL SOCIETY, Inc.
An affiliate of the Champaign Park District

September, 2005

PRESIDENT'S MESSAGE

I hope everyone is enjoying this great weather we are having. It is nice being able to go outside and not sweat to death. My grass is greener but the bad thing about this nice weather is that the grass needs to be cut more often. sigh....

I had an interesting thing happen to me the other day. I went to breakfast and one of the waitresses knew I was into astronomy and asked me about Mars. It seems that she had been telling everyone how big Mars was going to be. She told me she had heard that it would be as big as the Moon. Now she is a great lady but I had to burst her bubble. We discussed it for a while and I think she now understands how "big" it is going to get. If you hear of someone telling the same type of story, gently give them the real scoop, they will appreciate it. I know my friend did.

I would like to thank the people who went to Allerton Park last month to help them out with their program. I really makes the club look good when we help out like that. It reflects well on the club and also on you – the people who helped out. Thanks folks!

This month we should have a new section in the newsletter from the Jet Propulsion Laboratory. As we stated last month we will have the "NASA Space Place" column added to our newsletter. Please tell them and us what you think about the new column. I know that a lot of work goes into it from the people at JPL and that they would like to hear back on their efforts.

As normal (at least around here) our Perseid meteor party was clouded out. Was anyone anywhere where there weren't clouds? If so did you get to see any meteors? I did see the Moon a time or two but that was about it.

We did get the data monitor for the observatory. I have set it up and Bob Rubendunst. and I will be taking it out to the observatory to find a good place to put it. We expect to download the data every thirty days and graph the temperature and humidity reading to see how the observatory is holding up. For those of you who are wondering why we are doing this, our 16.25" Cassergrain had some problems with the coating. We are trying to determine if this was a problem with the coating itself or if the coating was affected by the temperature and/or humidity. This will take some time but with the measurements that Mike Lockwood took when he reconfigured the mirror we have a good baseline to compare future measurements with.



CUAS DIRECTORY:

Mike Matthews, President	586-5084
Mike Conron, Vice-pres.	355-5996
Guy Hampel, Secretary	352-3690
Phil Wall, Treasurer	352-5442
Jeff Bryant, 5 th Director	840-5251
Mike Rosenberger, Obs. Dir.	598-2254
Chris Pond, Webmaster	352-5426
Dave Leake, Newsletter Ed.	359-6644
Kevin Crump, CPD	398-2372

Our next New Moon observing session is September 3, and the Family Skywatch is September 10. I hope to see many of you out at the observatory this coming month and at the upcoming meetings. Clear skies,
Mike

LOOKING UP THIS MONTH

Have you been watching Venus & Jupiter play tag in the west-southwest? Right at the beginning of this month, they'll be only 1.2 degrees apart. Jupiter will appear to head off to the lower right of Venus as Venus sets its sights on Spica, the brightest star in Virgo. They'll be about $1\frac{1}{4}^{\circ}$ apart on the night of September 6-7 when they'll also be joined by a neat crescent Moon.

The magazines point out an interesting effect. Given the angle the ecliptic is making with the horizon, Venus seems to move more to the south than it rises in altitude. Watch it swing to the southwest this month. Telescopically, Venus appears to us like a gibbous Moon. In mid-September, Jupiter sets at 8:15pm CDT while Venus follows about 30 minutes later.

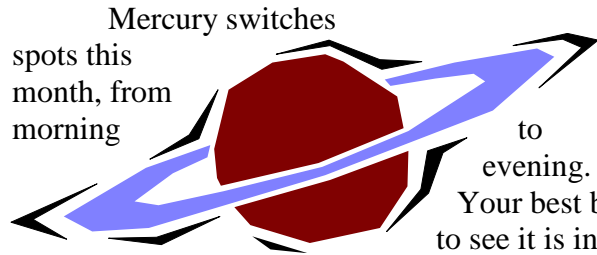
After Venus, attention will turn to Mars, rising just before 10:30pm at the beginning of the month and 8:30 at the end of the month. Opposition isn't too far away! As we approach Mars, it's getting brighter (from magnitude -1 to -1.7) and larger in apparent size (14 arc seconds increasing to 18 arc seconds just this month). See if you can see the small south polar cap this month. You'll have to wait until Mars is higher in the sky and out of the atmospheric muck. Mars will be roughly halfway up in the sky and due south near the beginning of morning twilight. The magazines are already gearing up for a good three months or so of excellent Mars observing. Check them out! And see a waning gibbous Moon near Mars on the 21st.

Saturn rises next in the sparse constellation of Cancer, between Gemini and Leo. In fact, Saturn will be brighter than any of the stars in Cancer, including the beautiful star cluster, M44, the Beehive. Saturn will appear to pass the cluster on and around September 14th. Saturn rises at about 2:45am CDT at midmonth.

Mercury switches spots this month, from morning to evening. Your best bet to see it is in the morning hours at the very beginning of the month. In fact, Mercury is just coming off of maybe its best pre-dawn showing when it was best seen about the 3rd week of August. It rises in the twilight in the first week of September. Use a nice waning crescent Moon just to the left of Mercury on the morning of September 2nd. Around September 19 or so, Mercury will seem to blend with the Sun and then reappear in the evening sky. The problem here is, for the same reason Venus isn't getting to high each night, Mercury doesn't get very high either. In fact, your best chance will be in early November when Mercury sets only 30 minutes after the end of evening twilight.

We have both the Autumnal Equinox this month and the Harvest Moon. The former occurs at 5:23pm CDT on September 22. Summer is then officially over! Bummer! Contrary to popular belief, the Harvest Moon does not always occur in September (though I heard someone on the TV news say that the other night). The definition is the full Moon that occurs closest to the equinox which, this year is on the evening of September 17-18. Good luck to the farmers out there who are bringing in the fruits of their labors. The lack of rain this summer certainly didn't help anything.

Start watching Mars and we'll see you next month. -DCL

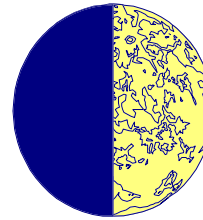


Planet	Date	Constellation	Magnitude	Distance*	Apparent Diameter
Mercury	9/11	Leo	- 1.6	122.7	5.1''
Venus	9/15	Virgo	- 3.9	96.2	16.1
Mars	9/15	Taurus	- 1.3	54.8	15.9
Jupiter	9/15	Virgo	- 1.7	585.2	31.3
Saturn	9/15	Cancer	+0.4	892.8	17.0
Uranus	9/15	Aquarius	+5.7	1776.1	3.7
Neptune	9/15	Capricornus	+7.9	2721.4	2.3
Pluto	9/15	Serpens	13.9	2884.1	0.1

* in millions of miles from Earth

Moon Phases:

New	September 3	October 3
1 st Quarter	September 11	October 10
Full	September 17	October 17
3 rd Quarter	September 25	October 24



CUAS NEWS

We've received a check from **Amazon.com** for \$101.40. If you purchase things regularly from Amazon, get there by clicking on the link on the CUAS web page. The club receives a kickback for items purchased.

Mike Matthews is taking orders for the **new book** entitled "The Grand Tour" by Hartman. The book contains some great information and stunning artwork. If we can get ten or so buyers, there's a price break to roughly \$11. Give Mike a holler if you're interested.

Star Party News it doesn't appear there will be an official star party (where other groups are invited) in October, but we can still do a night of observing from this new site, south of Walnut Point State Park. We can maybe observe there once for the experience, then plan a full-blown party in the near future. Guy Hampel will coordinate the observing this October. The site will host 48-50 dads and their kids for Thursday through Saturday night camping in the meadow. This is a large home school group, with the dads coming from 2-3 surrounding states in addition to Illinois. It's OK to camp on the site if you wish.

Mars Observing several have asked about this. Recall the 1,200 or so that showed up at Meadowbrook Park in 2003! We may not get that many for this opposition and it could be colder, so we've decided to hold observing Sunday night, November 6th, outside the Staerkel Planetarium. In this way, we can use the planetarium lobby as a warm room, have restroom facilities, and can even sell Mars shirts and hot chocolate (if you want). This does not mean this has to be the only Mars observing, but this is one we're going to freely publicize.

At the August meeting, the club approved a measure that would make the standing CUAS president a member of a new **advisory board** for the Staerkel Planetarium. The board will meet as needed, mostly via email, and give input on planetarium policies and procedures.

Dave Leake spoke at the **Decatur Area Astronomy Club's annual Jamboree** at Friends Creek County Park near Cisco. He also spoke with both Bryan Maple and Dave Byrne of DAAC. Mr. Byrne is the club president and webmaster. They have an awesome web page at <http://decaturastronomy.com>. They only have about a dozen members at this time. Though no dates have obviously been set, but Dave and Bryan talked about the possibility of a joint observing session between DAAC and CUAS in the meadow at Allerton sometime in the near future. Might we invite them October 22?

During Dave Leake's recent move, he found some **equipment** that goes with the Meade telescope at the dome. It's mostly battery packs and camera bodies donated by Ronald Rotunda. The equipment is currently at the planetarium. There's also a nice, homemade wooden tripod and a short-focus 4-inch homemade scope on a pipe mount that Dave is trying to give away. Speak up, or it will get pitched.

2006 Calendars We now have 20 or so Astronomy magazine 2006 calendars for sale, first come, first served. They'll retail for \$12 to non-members and \$10 to club members.

CUAS Treasurer's Report

28 Aug 2005

Income last 30 days

\$101.40 - Amazon.com affiliate sales program
30.00 - two new basic memberships
50.00 - sale of 5 astronomy calendars
50.00 - anonymous donation (thank you!!)
\$231.40 - total income

69.56 - Champaign Park District (May-August postage)
\$256.76 - total outgo

Money assets

\$2239.76 - checking account balance
\$ 101.00 - petty cash envelope
\$ 124.00 - cash and checks awaiting deposit
\$2464.76 - total

Outgo last 30 days

\$187.20 - to Mike Matthews for temp. sensors and software

Philip J. Wall

Light Pollution Report The Champaign lighting code has been distributed to interested parties in an effort to look at and amend the code and take those amendments to the Zoning Board of Appeals. The goals of the code are excellent, but the actual ordinance stops short of where it needs to go. If you're interested in being part of this (and the more, the merrier!), contact Dave at dleake@parkland.edu or 359-6644.

If you want to get your club news fast, please subscribe to the **Cuas-l email list**. Sometimes people will email and say they will be observing that night and will ask for people to join them. There is also news of new comets and possible auroral displays. To subscribe, just go to the Cuas-l web page at <https://mail.prairienet.org/mailman/listinfo/cuas-l> and follow the subscription directions. Email cuas-l@lists.prairienet.org to post.

OBSERVATORY NEWS!

Several items regarding the observatory were mentioned at the August meeting:



- It was requested that Telrad bases be purchases for all the telescopes at the observatory so the Telrad unit could be easily moved depending on what scope is in use.
- The Hobo temp/humidity unit is here and will be installed soon.
- Given the number of telescopes at the dome site, the thought was entertained of getting rid of some of them through either a silent auction or even some sort of “garage sale” with proceeds going to the club. IF this happens, club members would get first choice. There’s a nice Criterion 6-inch reflector out there that doesn’t get used much.
- Guy Hampel brought the 2-inch diagonal from the observatory. The flat mirror is in need of recoating. Mike Lockwood will look at prices and make a report. (Guy volunteered him!)
- The 6-inch refractor, once sitting on the Cassegrain scope but removed during the refurbishing process, is back in operation. Observers had it sitting on a mount provided by Willard Brinegar and the views were spectacular!
- Mike Rosenberger reported on vent prices for the shed. Prices range from \$6 for an aluminum roof vent to \$16-30 for a wind-powered turbine vent. It was noted that the turbine vents, though they move a lot of air, do seem to wear out quickly. The vents with the solar-powered motor cost more. No decision was made. However . . .
- There was discussion of maybe another building at the site, either a new shed for storage OR even a roll-off roof observatory to compliment the Cassegrain scope. Fundraising will be the key! Any ideas out there?

The Mow List returns! If you want to be on (or removed) from the list, email Dave Leake. When you mow, contact the next person immediately so they can plan when to go out and check the lawn. Thank you!

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|---------------------|-----------------|---------------------|
| 1) Mike Rosenberger | 4) Mark Prather | 7) Bob Rubendunst |
| 2) Dave Leake | 5) Guy Hampel | 8) Audrey Ishii |
| 3) Mike Matthews | 6) Wayne James | 9) Willard Brinegar |



LOOKING AHEAD

September 3	New Moon Observing	7pm - ?	Observatory
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September 8	CUAS Club Meeting	7-8:30pm	Staerker Planetarium
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Program to be announced . . .

September 10	CUAS Family Skywatch	7-10pm	Observatory
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This is our public event of the month so we could use a few volunteers to staff the observatory and some telescopes outside. The dome can be found by taking I-57 south of Champaign to the Monticello exit. Take this exit and go 1.4 miles to the west to County Road 700E. Turn left (south) here and the dome is on your left about 0.8 miles down this road. All observing sessions are weather permitting. Call 351-2567 for cancellation notices.

September 20	Registration deadline for workshop		
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The planetarium’s “Basic Astronomy” workshop for beginners will start a week from tonight, but this is the deadline for registration. See the fall “Live & Learn” brochure for registration information.

September 23	Fall Prairie Skies Opens	7pm	Staerker Planetarium
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October 1	New Moon Observing	7-?pm	Observatory
October 8	CUAS Family Skywatch	7-10pm	Observatory
October 13	CUAS Club Meeting	7-8:30pm	Staerkel Planetarium
October 22	Allerton Observing	7-11pm	Allerton Park
We'll need someone to do a talk for 20 minutes, then observing from the meadow. All observing sessions are weather permitting.			
October 27-29	CUAS Observing	TBA	South of Walnut Point SP
October 28	"Across the Sky"	7pm	Staerkel Planetarium
November 5	CUAS Family Skywatch	7-9pm	Observatory
November 6	Mars Observing	7-9pm	Staerkel Planetarium
Bring a telescope and set it up west of the planetarium, weather permitting, and we'll show the public what Mars looks like through a telescope. We can sell T-shirts inside the lobby at the counter if desired.			
November 10	CUAS Club Meeting	7-8:30pm	Staerkel Planetarium

CHECK OUT ALL CLUB EVENTS ON THE CUAS HOME PAGE:

<http://www.prairienet.org/cuas>



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 jettisons 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.

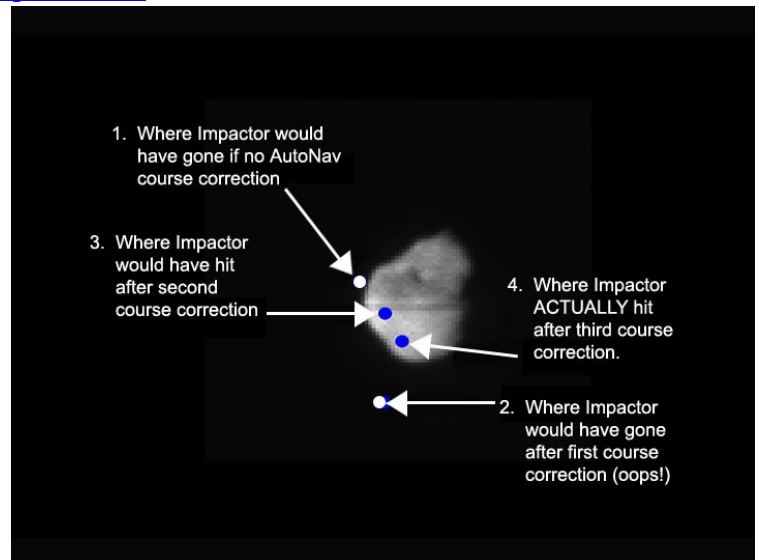
“Without AutoNav, the impactor would have completely missed the nucleus,” says JPL’s Ed Riedel, who led the development of AutoNav on Deep Space 1 and helped colleague Dan Kubitschek implement it on Deep Impact.

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 and the two following). Also, for junior astronomers, the Deep Impact mission is described at <http://spaceplace.nasa.gov/en/kids/deepimpact/deepimpact.shtml>

Comet Tempel 1, as seen by the Deep Impact impactor’s camera. Three last-minute AutoNav-controlled impact correction maneuvers enabled the Impactor to hit the bulls-eye.



MEMBERSHIP FORM

- Enroll me as a new member!
- Membership renewal [attach mailing label]
- Change of address only

Name _____
 Address _____
 Phone # _____
 Email address: _____

Make all checks payable to:
 “Champaign-Urbana Astronomical Society”

Circle all that apply:

- Basic membership \$15
- Observatory key fee \$10
- Astronomy magazine renewal* \$29
- Sky & Telescope renewal* \$33
- Donation \$ _____
- Total Enclosed \$ _____

*enclose mailing label

Detach and mail to:

C.U.A.S.
 C/o Phil Wall
 607 West Healey #11
 Champaign, IL 61820

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The Champaign-Urbana Astronomical Society is an affiliate group of the **Champaign Park District**. <http://www.champaignparkdistrict.com>

William M. Staerkel Planetarium has public shows on Friday evenings in August. Call 217/351-2446 for more information. <http://www.parkland.edu/coned/pla>



**Champaign-Urbana Astronomical Society
C/O William M. Staerke Planetarium
Parkland College
2400 West Bradley Avenue
Champaign, IL 61821**