

September, 2005
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The Bulletin

**The September General Meeting, September 10, 7:00 PM Goethe
Link Observatory**

Computer Simulations of Protoplanetary Disks and Gas Giant Planet Formation

**Dr. Richard H. Durisen
Professor of Astronomy Indiana University**

With well over 150 giant planets now discovered around other stars, theoretical efforts to understand their formation have intensified. There are two basic theories for how gas giant planets form --core accretion plus gas capture and disk instability. I will explain how these mechanisms are supposed to work and point out their relative strengths and weaknesses. I will then present results from computer simulations which suggest that real planet formation may be a hybrid process, where disk instabilities create conditions in the disk that accelerate core accretion.

Dr. Durison has been a faculty member in the Department of Astronomy at IU Bloomington for 29 years. He received my PhD from Princeton University in 1972 and spent his postdoctoral years at the University of California Santa Cruz and at NASA-Ames Research Center. During his years at IU, he has spent sabbaticals at NASA-Ames and at the Max Planck Institute for Extraterrestrial Physics near Munich. Most of his research involves computer simulations of astrophysical gas and particle systems. His work on planet formation is supported by a NASA grant.

McCloud Under the Stars – September 2-5 Labor Day Weekend

Labor Day weekend we will have our second annual IAS Star Party at McCloud. Members are welcome to come for the weekend and camp and observe and have a good time for four days if you like. The NAG will meet on Friday night and the public is invited. Then we have the park to ourselves for the rest of the night as we do each month. Normal park activities will go on throughout the weekend and we will have the opportunity of showing the public our toys and teaching them about our passion. During the day we can hike, observe the sun, gab, hold programs, and maybe even sleep. There will be a picnic for the members and their family at 5PM on Saturday afternoon. All the food etc is furnished by the Society. Also Saturday afternoon, bring all that special astronomical gear you do not need. We will hold a flea market where you can buy that piece of equipment that you really need. Last year was a ball and let's make this one even better.

The Pres



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.

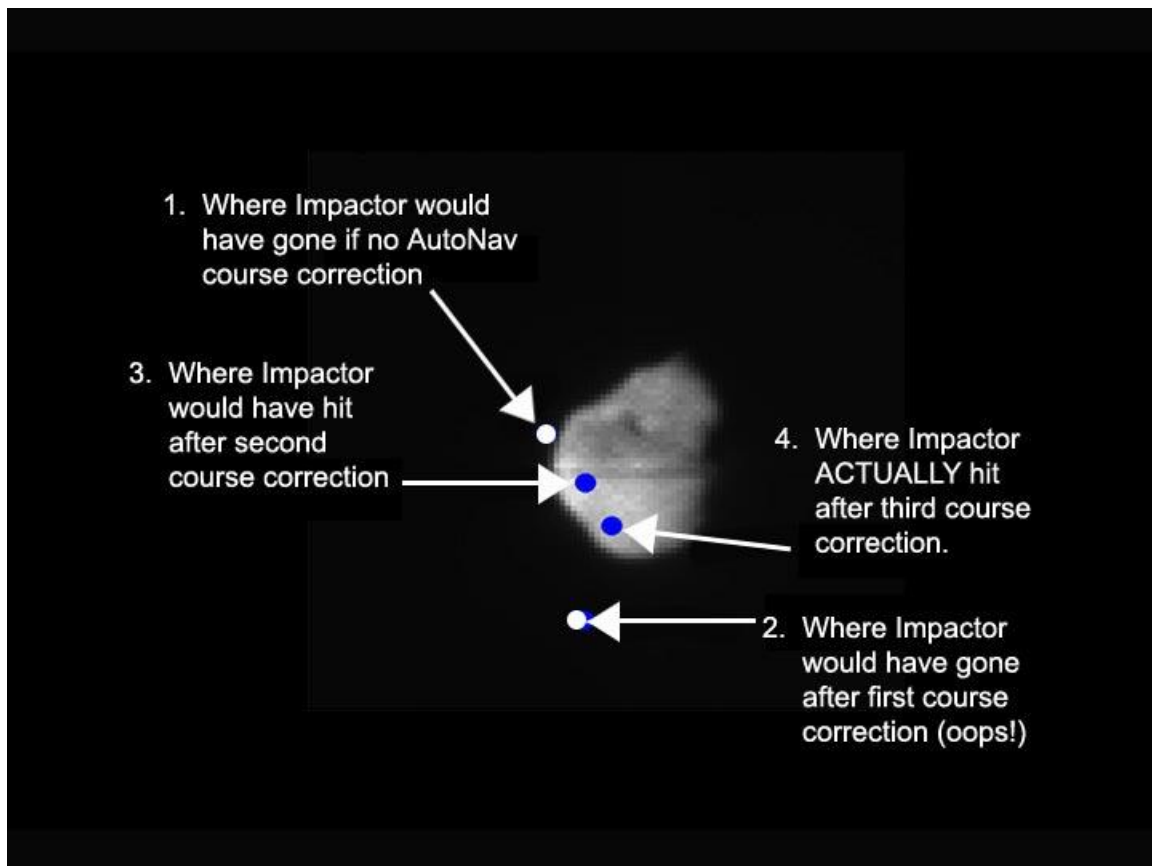
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En route to the nucleus, AutoNav “executed three maneuvers to keep the impactor on course: 90, 35, and 12.5 minutes before impact,” says Riedel. The nearest human navigators were 14 light-minutes away (round trip) on Earth, too far and too slow to 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>

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



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.

Nebraska Star Party a Success

Seven of our members sojourned to central Nebraska to bask in the sun and see the bright skies. Boy did we bask!! Temperatures were in the high 90s to low 100s all week. Mike Wolford, Bill Conner, and Jeff Patterson decided to go out early and see if they could catch a good sky. NSP is in the sand hills of Nebraska about 950 miles from Indianapolis and in a rather isolated area. There are no phones nor cell phone reception and no hookups in the observing area.



This is the observing field. There is not much crowding unless you are looking for a tree for shade.

We enjoyed watching the “Aviator” on the first night as the sky opened up and rained and blew. We had spotty observing initially but got a few hours each night. The last four days were great with good seeing. We were joined by Brian Murphy, John Molt and Terry Steadham on Sunday. We then settled down to serious observing. We had a group from Bloomington Il. show up and as soon as they saw the camp they wanted to know where Sandy was. Mike had to explain all week that Sandy had to work while he played. This is

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one of the good things about a star party. You meet people from all over the country and develop a relationship and share ideas. We made a lot of new friends.



Brian readying for a night of observing.

The nights were great. You cannot believe the milky way in those skies. It is very bright and you can see the star clouds all over the sky. My new Nagler 31 in the F/9 and the F15 refractors was outstanding. Brian and Bill had fun with binoculars looking for the North American Nebula and its details. It was visible to the naked eye by the way. Chris Dietz came in later in the week and got a great picture of the Deer Lick Group which is a group of galaxies in Pegasus.



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Chris Dietz's photo of the Deer Lick Group

I was looking at the Cat's Eye Nebula and saw detail that I had never seen before visually. There is a 15th mag planetary in the field of view that we worked hard to find. Some of us could make it out. The details in the galaxies visually is fantastic. The real advantage of going to these dark sites is that one can really pick up detail.

Nebraska in August is hot!! Most days were 100°+. The air conditioner felt good but if you got in the shade with a breeze it was o.k., The ice cream social helped. Midweek they had a bar-b-que and we had a good time. No one brought home any door prizes but we enjoyed ourselves. Terry and I left Sunday and took a little detour to the Bad Lands National Park and Wall Drug. It was a little different this year on the road as the Sturgis Stampede was starting and the roads and hills were covered with bikers. If you are not familiar with this phenomena, Sturgis is a small town in western South Dakota with a population of about 20,000. In a week in August, about 500,000 bikers show up to party. Interesting!! I don't know how the infrastructure can handle it.

NSP is a well planned event and really worth the effort to go. It will be in the last week of July next year. Come out and be with us.

Annual Hog Roast October 8, 2005 at the Link Observatory 5:00 PM

We are planning our annual hog roast to be held October 8 at the Link. All members and families are invited. The Society will furnish the meat and drinks and table service. Please bring a vegetable or dessert. This has been a very successful event and we always had a lot of fun. Plan on coming out.

McCloud Nature Park and the Indiana Astronomical Society Formalize Plans

McCloud Nature Park, a sprawling 230-acre property at the Hendricks County's northwest edge, is both wooded nature park and wildlife habitat. McCloud is a natural complement to the area's rural character, and it's the perfect hiking and picnicking getaway in fast-growing metropolitan Hendricks County. Best of all, it enjoys DARK SKIES!

The Hendricks County Park and Recreation Board and the IAS have finalized plans to install permanent observing facilities to make nighttime stargazing a safer and more comfortable pastime.

The IAS has been informally hosting Star Parties at McCloud for the past two years. The turnout for the events has been so overwhelming that the decision was made to install permanent concrete equipment pads, safety lighting, and a warming room. These improvements will offer IAS members, and the public, a safer and, more comfortable experience.

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"We need to pour six small concrete pads to give our telescopes, and the viewer, a stable, dry surface. In addition we'll run conduit to each pad for safe lighting, and other equipment. Lastly, we plan to place a small warming shed" says IAS President, Jeff Patterson. The project is expected to cost approximately \$3000. The Board approved a motion last meeting to go ahead and fund the project out of the treasury and to reimburse the treasury by donations and raffles. The IAS will contribute volunteer labor.

**McCloud Nature Park Project
Raffle Raffle Raffle**

In an effort to fund the project the IAS Board has created a "McCloud Fund". All donations to the Fund will go directly towards funding the improvement project. To kick off the fund the IAS is raffling a 5", f5 Orion refractor! Here are the details: Winning ticket gets you a new 120mm, f5 Orion achromatic refractor with 2" focuser (Orion item #09836). For each \$25 that you donate you will receive one ticket in the drawing. Your money must be received before the drawing. The drawing will take place at the September 10th general meeting. You need not be present to win. You can buy tickets at the meeting or mail a check to:

Brian P. Murphy
430 Massachusetts Ave
Suite 104
Indianapolis, IN 46204

Make your check payable to the Indiana Astronomical Society. Be sure to include your address and telephone number.

If you would like to make a cash donation to the McCloud Fund, please send it to:

John Shepherd, Treasurer
4609 Callahan St.
Indianapolis, IN 46239

The IAS in a Not-For-Profit 501 C-3 corporation. Your donation may be tax deductible. Consult your tax advisor.

**New Astronomer's Group - McCloud Nature Center - 7:00 pm –
September 2**

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The final monthly meeting of the Indiana Astronomical Society's New Astronomers Group for 2005 will be held on Friday, September 2 at McCloud Nature Center starting at 7:00 pm, just prior to the monthly McCloud Friday Night Observing session.

THE NAG MEETING WILL BE HELD, RAIN OR SHINE.

Topics for this month:

What's up in the autumn evening sky?

The Pointer Stars and The Summer Triangle

Our Solar System

The Autumn Deep Sky

M15 - Globular Cluster in Pegasus

M31 - Andromeda Galaxy in Andromeda

Alpha Persei Cluster in Perseus

NGC 869 and NGC 884 – The Double Cluster in Perseus

NGC 457 – Owl Cluster in Cassiopeia

Autumn's Finest Double Stars

Observing Mars this autumn

Question and answer session

The purpose and intent of the NAG is to introduce new astronomers to observing the night sky. All types of observing will be discussed including naked eye, binocular and telescope.

If the weather cooperates, following the meeting, IAS members will have telescopes set up and attendees will have an opportunity to view some of the night sky objects discussed during the meeting.

By John Switzer

Upcoming Elections

Man!! Time flies!! The Board is seeking names of people interested in leading the Society. Each year the Officers and specific Board positions are up for election. This year the four officers positions and two Board members are up for election. The elections are in November but a list of nominees has to be in by October. If you have a desire to lead the Society and help it to grow, we need you. It is not hard work and at times is really fun. It is not a closed group. Any eligible member is welcome.

See anyone on the Board to place your name on the slate.

The Pres

Upcoming Star Parties and Registrations

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McCloud Under the Skies - September 2-5 McCloud Nature Preserve This is the IAS' own party and is open to the McCloud public as well.

Astrofest - September 8-11 – Kankakee, Il. This is a good four day party and has a great flea market. It is located at a new location (new last year) called Vana's Farms. It is about the same distance out of Kankakee as the old site but in a different direction. Registrations are due before August so register now. If you haven't registered it is really expensive. Plan on next year.

"Hidden Hollow" Star Party - September 30 - October 2 at Warren Rupp Observatory in Mansfield, Ohio. <http://www.wro.org/hiddenhollow2005.htm>

Prairie Skies Star Party - September 29 through October 02, 2005. Kankakee, Illinois
www.prairieskies.org

Twin Lakes Star Party – October 1-9, 2005 Pennyrile State Park, Kentucky,
<http://www.wkaa.net/article.php?articleid=56&cat=SE&ret=index.php> This is an outstanding dark site as well.

Illinois Dark Skies Star Party – October 6-9 2005 is the fourth year for the Illinois Dark Skies Star party (Oct. 6-9) at one of the finest state park facilities in the heart of the Land of Lincoln. We'd like for the Indiana Astronomical Society to be a part of what is turning out to be a great "observer's" event. Regular registration is \$45 per person, but for this year we are making a registration discount available for select astro groups. The IAS is one of those. Although we have had attendees from all over the country, we've never had anyone from your group to share our dark skies, good stories, tips, talent and information. This year, we are lowering registration fees for your members to \$35 per person for a group of five or more. We are lining up interesting speakers, have a great food menu to pick from and nice attendance prizes. This year, SmartAstronomy (www.smartastronomy.com) will be our star party vendor. Other events planned are "The Knowledge Bowl," an astronomy trivia contest with great prizes and a swap meet where you just might find that missing accessory you've been searching for or maybe a great deal on a second scope.

If you know of events coming up let me know and I will get them in the Bulletin

Observer's Corner

I was talking about a little planetary near the Cat's Eye Nebula and got this reply from Paul Alsing. "That "planetary" (IC 4677) is actually just a knot in the outer envelope of NGC 6543, see <http://observers.org/reports/97.11.01.5.html> for a great observing report."

IC 4677 (part of NGC 6543) observation

By [Steve Gottlieb](#)

This unusual object is a irregular knot in the outer halo of the bright planetary N6543 (Cat's Eye) 1.7' W of center and appearing visually completely detached from the bright planetary. It's been previously catalogued as a galaxy (MCG +11-22-017,VV 121, PGC 61193) and is misclassified in amateur sky charting software. I observed this knot with my 17.5" last weekend and noted: "suspected

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at 220x without filter close to a mag 15 star located 1' W of the planetary. Using a UHC filter, clearly visible with averted vision as a very faint elongated patch, ~25"x15" oriented SW-NE. Requires averted for a good view but can almost hold continuously. Also visible at 140x with OIII filter and 280x with the UHC, but 220x provided the best view." I don't think this object is widely known about even with its very close proximity to a bright planetary.

The following comments on IC 4677 are from Harold Corwin's investigation of this object from the [NGC/IC Project](#) - go to the "Corrected NGC/IC" page for his NGC/IC corrections.

IC 4677 is a part of the corona of NGC 6543, the bright planetary near the north pole of the ecliptic. It is a complex of relatively bright knots in the planetary's corona, preceding the central star by an arcminute or so. While its position has never been in doubt (Barnard's position and description of it in his private communication to Dreyer is exact, and there is a sketch of it in his Yerkes observations along with several micrometric measurements, all kindly sent to me by Leos Ondra), its character has been questioned, primarily by Vorontsov-Velyaminov. He included it in his first list of interacting galaxies (where it is No. 121), and in the MCG (it is MCG +11-22-017). This is a bit surprising as VV was an early authority on planetary nebulae; his book from the 1930's is now something of a classic on the topic. Still, the object does look something like a distorted late barred spiral on the PSS prints.

It is nevertheless clear that the object is not an interacting galaxy. Its radial velocity is the same as N6543 (-70 km/sec), and large scale photographs clearly show filamentary connections between it, the planetary, and the rest of its corona. The best photo that I've seen is that published in AJ 79, 1259, 1974, taken with the Mayall 4-m telescope at Kitt Peak

The Pres

Local School Events and Star Parties

Gerald Venne has accepted the position of Public Program Chairman. He will be responsible for coordinating Public Events for the IAS. Thanks Gerald.

To schedule a public event contact Gerald Venne 1 317 826-2680 or Jeff Patterson at 1-317 882-8055.

Astro Ads

Are you changing or upgrading your equipment? Do you have or are you looking for astronomical materials and equipment? The Indiana Astronomical Society as a service to its members, will

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publish non-commercial ads at no charge. The ad will stay in the Bulletin for 4 months and may be renewed at the owner's request.

To place an ad contact:

Bulletin Editor
Jeff Patterson
1780 S. Morgantown Rd.
Greenwood, IN 46143
(317) 882-8055
E-Mail: JMPSR@Iquest.net

For Sale - Meade ETX-90EC astro telescope , it has the manual controller and the autostar computer controller, the worm gear has been replaced (Good as new). I have upgraded the finder to a 45 degree. Extras, 1 Meade super plossl 26mm eyepiece, 1 Sirius plossl 10mm eyepiece, 1 Orion illuminated ke12mm, 1meade 2x-3x variable barlow, 1 mead camera adapter (fits into eye piece hole), 1 Meade ETX camera adapter (fits onto back of ETX, 1 camera ring, 1 35mm Yashica camera, 1 remote camera switch, 1 Meade Series 4000 lunar filter, 1 45 degree prism adapter, 1#883 deluxe field tripod, 1 nice metal carrying case for the extras, am letting go also several star chart books ,the Norton 2000.0 sky atlas. \$700 obo thank you for your time. day time phone (317) 359 0229 John Miller (12/05)

Loaner Equipment Program

Did you know you can borrow a scope or piece of astronomy equipment from the Society and take it for a test drive? The Society has a program where members who are trying to determine what kind of equipment to buy can borrow one of the Society's scopes for a month or two and see how they like it. John Molt is the chairman of

the program and can arrange for your pickup and training on the use of the particular instrument. This is a great way to see what telescope you want to purchase. We have several scopes, eyepieces and binoculars to loan. Contact John Molt at 1star-gazer@earthlink.net.

List Server Online - Don't be left in the cold - Sign up!

This service is our main communication tool. The list server is in the "Members Only" section of the site and is accessible only by IAS members. Make sure we have your correct e-mail and you will have access for late updates to events and functions.

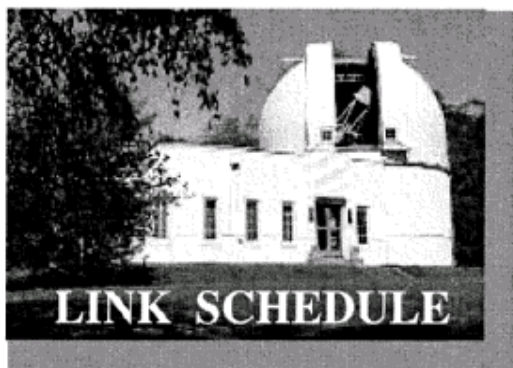
Note: The list server is for use of Society business. It can only be used according to the rules as outlined previously. Members abusing the service will be eliminated from the service.

August Board Meeting – August 18, 2005 - 7:00 PM

The IAS Board Meeting is being held at 430 Massachusetts Avenue in downtown Indianapolis. The building is at the point of convergence of Mass. Ave., Vermont and Alabama Streets. There is a Starbucks located in the frontage of the building. The coffee shop stays open late into the evening. Try to park as close to Starbucks as possible, preferably in a metered space. On-street parking is free after 5pm. Handicapped parking is directly in front of Starbucks entrance. The main entrance to the building is to the right of Starbucks, but it will be locked. To get into the building, walk around the

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building to the left as you are facing Starbucks. You will cross Starbucks outdoor patio seating area and you will come to the double door entry into the building (this is the south building façade). These doors will be unlocked. Enter the lobby and ride the elevator (to your right) to the basement. Turn right as you exit the elevator and go through the first door on your right. This is the conference/meeting room. If you need further assistance, please contact Brian P. Murphy, IAS Vice-President on his cell phone 716-8124.



Observatory Address

**Goethe Link Observatory
8403 N. Observatory Lane
Martinsville, IN 46151**

**Observatory 's Phone:
(317) 831-0668**

This schedule is being published to assure proper access to the Link Observatory for programs that are designed as observational, general education, astronomy conferences or amateur research projects. Training programs are tentatively scheduled for Saturday evenings only. Although other requests can over-ride these sessions. It is the purpose of this listing to prevent activity conflicts. If you need to acquire use of the 36-inch telescope: remember two important IAS guidelines: 1) *There has to be two or more IAS members present.....* 2) *contact the Observatory Manager: Gary Schoppenhorst (317)297-1405. DON'T WAIT UNTIL THE LAST MINUTE TO MAKE YOUR REQUEST OR YOU MAY NOT GET ACCESS.*

Designated Link Observatory Key Holders

Jeff Patterson: 882-8055
Tom Borlik: 849-4113
Gary Schoppenhorst: 297-1405

Brian Murphy: 841-8511
Dave Williams: 769-7430
Gerald Venne: 826-2680

Link Activities for August:

Observing sessions - Sept 10 and Sept 24
Observer's Meeting - Sept 24
Link Training - Sept 24

General Meeting Sept 10

McCloud Activities for August:

McCloud Under the Stars Sept 2-4
New Moon Group - September 2

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New Astronomer's Group (NAG) – Sept. 2

Observing Activities

We are able to go to the Link, Prairie Grass Observatories and McCloud Nature Park at non scheduled times if they do not conflict with reserved activities:

For those interested in going to The Link Observatories for observing call Gary Schoppenhorst.

For those interested in going to Prairie Grass Observatories for observing call Hoppe at 1-765-296-2753.

At this time, the caretaker position at McCloud is in transition. We need to make contact with the new caretakers before going out for non-scheduled events.

Bulletin Stats

All personal and professional opinions presented herein do not, in any way, represent the opinion or policy of JPL or NASA.

Accessing the Bulletin

The current bulletin can be found on the website www.iasindy.org

Bulletin - Bulletin deadline on the 20th of every month

The monthly newsletter welcomes articles of local astronomical interest information and want ads:

Please submit to

The Indiana Astronomical Society, Inc

Jeff Patterson, editor

1780 S. Morgantown Rd

Greenwood, IN 46143

Phone: (317) 882-8055

JMPSR@Iquest.net

Membership information

Contact any IAS officer or the membership chairman

Larry Phillips

9413 South PR Black Hawk Hills Dr.

Edinburgh, In 46124

llpastro@lightbound.com

Link Observatory

Latitude: 39 degrees, 33 minutes North

Longitude: 86 degrees, 24 minutes West

Phone: (317) 831-0668

IAS Internet address

<http://www.iasindy.org>

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Executive Officers

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Gary Schoppenhorst (2006)

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Marion Hakes (2005)

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Public Event Chairman

Gerald Venne gvenne@iquest.net 1 317 826-2680

Library Committee Chairman

Ed Otto ecottol@comcast.net

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September Calendar, 2005

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2 McCloud Under the Stars NAG	3 McCloud Under the Stars New Moon
4 McCloud Under the Stars	5 McCloud Under the Stars	6	7	8	9	10 General Meeting General Observing
11 First Qtr Moon	12 First Qtr Moon	13	14	15 Board Meeting 7:00	16	17 Full Moon
18	19	20	21	22	23	24 General Observing Observer's Mtg Link Training
25 Last Qtr Moon	26	27	28	29	30	

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Membership Application to the IAS

Benefits:

- Use of the Goethe Link Observatory
- Formal monthly programs with guest speakers
- Local and regional astronomical functions
- Discounted Astronomy publications
- New Moon observing activities
- Access to IAS member experts and problem solving
- The Bulletin monthly newsletter
- Free admission to the Holcomb planetarium
- Star party events and observing sessions

Please mark whether this is a new or renewal application

New

Renewal

Note: Magazine subscription renewals forms and payment must be submitted to the Treasurer in order to maintain publisher's club discount.

Name: _____

Address: _____

City: _____ State: _____ ZIP: _____

Telephone: _ () _____

E-Mail Address: _____

How do you want to receive the IAS monthly newsletter?

Downloadable from Website Hard Copy*

* Please note that hard copy costs the Society about \$1.50 per issue. Please consider this when selecting mode of receiving the newsletter.

Annual Regular Membership (\$25.00)	
Annual Student Membership (\$10.00)	
Astronomy Magazine Renewal (\$29.00)	
Sky and Telescope Magazine (\$33.00)	
Total Enclosed	

Make checks payable to: The Indiana Astronomical Society, Inc

Please complete Member Profile and include with the application

Mail Application to: John Shepherd, Treasurer
4609 Callahan St.
Indianapolis, IN 46239

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Member Profile

Spouses Name: _____

Children's names and ages: _____

Education: _____

Occupation: _____

How many years associated with Astronomy? _____

Special astronomical interests or projects: _____

Equipment: _____

What can the Society do for you? _____

What can you do for the Society? _____

Note: Profile information is not a requirement for membership to the Society. This information is entered into the IAS database and is not given nor sold for solicitation purposes. It does provide for a brief welcoming article for new members and may be used by the society to match people with similar interests.