



November, 2003

At the November 14 meeting...

NOTE: Meeting date changed due to lack of meeting space at U of H on November 7

Astrophotography

from the
International Space Station

Robert Reeves & Astronaut Don Pettit

Houston Astronomical Society
GuideStar

HAS Web Page: <http://www.AstronomyHouston.org>

See the *GuideStar's* Monthly Calendar of Events to confirm dates and times of all events for the month, and check the Web Page for any last minute changes.

★★★★★ **The Houston Astronomical Society** ★★★★★★

The Houston Astronomical Society is a non-profit corporation organized under section 501 (C) 3 of the Internal Revenue Code. The Society was formed for education and scientific purposes. All contributions and gifts are deductible for federal income tax purposes. General membership meetings are open to the public and attendance is encouraged.

★★★★★★★★★ **Officers & Past President** ★★★★★★★★★★

President: Kirk Kendrick H: 281-633-8819 Treasurer: Debbie Moran H: 713-666-9428
 Vice Pres: Bill Leach H: 281-893-4057 Past President: Don Pearce H: 713-432-0734
 Secretary: Brian Cudnik H: 832- 912-1244

★★★★★★★★★ **Additional Board Members** ★★★★★★★★★★

Bill Flanagan 713-699-8819	Liaison responsibility
Don Pearce 713-432-0734	Telescope Loaner Program
JayLevy 281-557-4920	Field Trip and Observing, Program
Christopher Mendell 281-488-8906	
Steve Sartor 281-370-3544	

★★★★★★★★★ **Committee Chairpersons** ★★★★★★★★★★

Audit Matt Delevoryas 713-666-9428	Program John Blubaugh
Education Richard Nugent 713-524-1993	Publicity Joe Khalaf 713-660-8219
Field Tr./Obsg. Kenneth Miller	Telescope Clayton Jeter 281-573-1337
Novice George Stradley 281-376-5787	Welcoming Marg Nunez 713-529-2549
Observatory Michael Dye 281-498-1703 Hannah Lange 832-715-7833

★★★★★★★★★ **Ad-Hoc Committee Chairpersons** ★★★★★★★★★★

Historian Leland Dolan 713-688-0981	Publ. Star Party Marg Nunez 713-529-2549
Librarian Peggy Gilchrist 281-443-8773	Rice U. Coord. Matt Delevoryas 713-666-9428
Logo Mds Sales Judy Dye 281-498-1703	Schedule Obs'v'ty Steve Goldberg 713-721-5077
Long Range Plan Bill Leach 281-893-4057	Texas Star Pty Steve Goldberg 713-721-5077
Parliamentarian Kirk Kendrick 281-391-3834	

★★★★★★ **Special Interest Groups & Help Committees** ★★★★★★★

These are now listed on the inside of *GuideStar* (not every month). See the Table of Contents

★★★★★★★★★ **Advisors** ★★★★★★★★★★

Dr. Reginald DuFour, Rice Univ. Dr. Lawrence Pinsky, U. of H.

★★★★★★★★★ **Dues and Membership Information** ★★★★★★★★★★

Annual Dues: Regular ... \$33.00	Student \$5.00
Associate \$5.00	Honorary None
Sustaining . \$50.00	

All members have the right to participate in Society functions and to use the Observatory Site. Regular and Student Members receive a subscription to *The Reflector*. Regular, Student, and Honorary Members receive *The GuideStar*. Associate Members, immediate family members of a Regular Member, have all membership rights, but do not receive publications. Sustaining members have the same rights as regular members with the additional dues treated as a donation to the Society. *Sky & Telescope* mag \$29.95/year, *Astronomy* mag \$29/year -- see club treasurer.

Membership Application: Send funds to address shown on outside cover of *Guidestar*. Attention - Treasurer, along with the following information: Name, Address, Phone Number, Special Interests in Astronomy, Do you own a Telescope? (If so, what kind?), and where you first heard of H.A.S.

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Check the web site:

<http://www.astronomyhouston.org>

Welcome to New Members!

The Houston Astronomical Society encourages you to join our group of active amateur astronomers and take advantage of the benefits of membership. As a member you'll have access to the club observing site near Columbus, Texas. (You're required to participate in a site orientation meeting before you get the gate lock combination.) The site has concrete pads for setting up your telescope, restroom and bunkhouse facilities, and areas set aside for camping. You'll get monthly issues of the *GuideStar* newsletter, you'll get to vote and to serve the organization as an officer, and you will be supporting the local amateur astronomy community.

Special Interest Group Listing

Any member who wants specific information on a SIG listed below may call the listed individual. Also, see the "Ad Hoc Committee Chairpersons" on the inside front cover and the "Special Help Volunteers" listing (not in every issue).

Advanced	Bill Leach	281-893-4057
Comets	Don Pearce	713-432-0734
Lunar & Planetary	John Blubaugh	713-921-4275
Occultations & Grazes ...	Wayne Hutchison	713-827-0828
Advanced	Bill Leach	281-893-4057

Observations... of the editor

by *Bill Pellerin, GuideStar Editor*

Astronomy Day was just great. The turnout was excellent (estimated to be 1800), the crowd was enthusiastic, and the skies were clear. The moon was just past first quarter, so it lit up the sky a bit, but gawkers (like us) were happy to be able to look at the moon, Mars, and a few bright deep-space objects.

I had my 8" SCT on site and had fun showing sky objects to the participants, and a couple of 'deep sky' objects. We looked at M11, the Wild Duck Cluster, and Albireo, the beautiful double star in Cygnus. M11 lost some of its sparkle due to the brightness of the moon, but still seemed impressive to those who took a look.

I had a serious problem with dew, and, of course, I forgot to bring my hair dryer. Fortunately, I was able to borrow one and everything worked out fine. I got to try out my new green laser pointer, which may have been more fascinating to the kids than the telescope. This is an excellent public star party tool for tracing out constellations, identifying stars, and so forth.

Bill Flanagan brought his German equatorial mount, his 4" refractor, and his hydrogen-alpha filter with the intention of doing some solar viewing during the day. Unfortunately, he forgot to bring some of the bits and pieces of the solar viewing rig, and he, like the rest of us, had to wait until nightfall.

Bill Leach did a super job getting the event together, and all of the work of the volunteers of the HAS and other clubs was greatly appreciated. I didn't count the telescopes on the observing deck, but there was a bunch of them.

Hanna Lange is now employed by the museum and working at the George. She was very excited about the opportunity to work there and was busy the whole day with the Challenger Center.

I'm really enjoying the cooler weather. I was out early this morning, before sunrise, and could see Orion near the meridian, Saturn in Gemini and Jupiter in Leo. These crisp, clear mornings are very inviting to those of us

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Houston Astronomical Society

Meeting Notice

For Friday, November 14, 2003

Note the date change to the second Friday

Because of mid-term tests, the UH has no meeting space available on 7-Nov.

The programs for the Novice and General meeting planned for 7-Nov will take place on 14-Nov (same time, same place). It is planned to postpone the elections until then.

Astrophotography

from the

International Space Station

Robert Reeves & Astronaut Don Pettit.

While Don was on the Space Station, Robert was communicating with Don via email on astrophotography. There were discussions about "barn doors", tracking and image processing, all from the ISS. Hear all about it at this month's meeting.

Schedule of meeting activities:

All meetings are at the University of Houston Science and Research building. See the inside back cover for a map to the location.

Novice meeting: 7:00 p.m.
Steve Goldberg discusses astrophotography

Site orientation meeting: 7:00 p.m.
Classroom 121

General meeting: 8:00 p.m.
Room 117

November/December Calendar:



Photo by Scott Mitchell

<i>Date</i>	<i>Time</i>	<i>Event</i>
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November 2003

8	7:13 p.m.	Full Moon
	7:19 p.m.	Total Lunar Eclipse
14	7:00 p.m.	Novice Presentation - U of H.
	8:00 p.m.	General membership meeting U of H. Annual HAS Elections Astrophotography from the International Space Station. Presented by Robert Reeves and ISS astronaut Don Pettit.
15		Members Observatory Night - Columbus
16		Last Quarter Moon
22		Prime Night-Columbus
23	4:59 p.m.	New Moon
30	11:16 a.m.	First Quarter Moon

December 2003

5	7:00 p.m.	Novice Presentation - U of H.
	8:00 p.m.	General membership meeting U of H. Presentation: Looking Forward to Comets
8	2:37 p.m.	Full Moon
14	Evening	Geminid meteor shower maximum; often bluish, bright, and slow.
16	11:42 p.m.	Last Quarter Moon
22	1:04 a.m.	Winter Solstice. Sun reaches furthest southern limit.
	5:51 a.m.	New Moon
30	4:03 a.m.	First Quarter Moon
31	3 p.m.	Saturn at opposition

*Send calendar events to JBlubaugh@aol.com
or call 713-921-4275.*

Hurricane Team Work

by Dr. Tony Phillips

On a gray breezy day last month thousands of people got in their cars and reluctantly left home. U.S. east coast highways were thick with traffic. Schools were closed. Businesses shut down.



Perfect!

When powerful Hurricane Isabel arrived some 38 hours later nearly everyone in the storm's path had fled to safety.

Days later Vice Admiral Lautenbacher, in a briefing to President Bush, praised the National Atmospheric and Oceanic Administration (NOAA): "Without NOAA's excellent track forecasts, hurricane Isabel's toll on lives and property would have been even more devastating. This is NOAA's first year of providing 5-day forecasts-and the 5-day forecast for Isabel was as good as our 2-day forecasts have been over the last decade."



GOES-East satellite image of hurricane Isabel as it makes landfall on September 18, 2003 at 1715 UTC.

Many people in NOAA played a role. A team of pilots, for instance, flew Gulfstream-IV High Altitude Surveillance jets right up to the approaching hurricane, logging 25,000 miles in the days before landfall. Their jets deployed devices called dropsondes-little weather stations that fall toward the sea, measuring pressure, humidity, temperature and wind velocity as

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they plummet. The data were radioed back to the aircraft and transmitted to forecasters on shore.

While two Gulfstream-IV crews flew night and day around the storm, a NOAA satellite named GOES-EAST monitored Isabel from above. (GOES is short for Geostationary Operational Environmental Satellite.)

From an orbit 22,300 miles above the Atlantic Ocean, GOES-EAST had a unique view. “It could see the entire hurricane at once,” says Ron Gird of NOAA. “Scientists used infrared spectrometers onboard the satellite to estimate the height of the storm clouds, their temperature and water content. GOES can also measure the temperature of the ocean surface—the source of power for hurricanes.”

Constant streams of data from GOES and the Gulfstream aircraft were fed to supercomputers at NOAA’s Environmental Modeling Center in Maryland where sophisticated programs, developed over the years by meteorologists and programmers, calculated the storm’s most likely path.

Supercomputers. Satellites. Jet airplanes. Scientists. Programmers. Pilots. It took a big team using a lot of tools to predict where Isabel would go—accurately and with time to spare.

Says Vice Admiral Lautenbacher: “I hope everyone at NOAA shares the pride of being part of a team effort that so effectively warned the public of impending danger and enabled citizens to take action to protect themselves and their loved ones.”

Well done, indeed.

To learn more about the GOES, see www.oso.noaa.gov/goes/. For kids, the SciJinks Weather Laboratory at scijinks.nasa.gov has lots of fun activities and fascinating facts about the wild world of weather.

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

HAS Nominating Committee Report

2004 Candidates

Board of Directors:

Officers:

President: Steve Sartor
Vice President Bill Leach
Secretary Brian Cudnik
Treasurer Bill Flanagan
Ex-Officio: Kirk Kendrick (automatic)

Directors-at-Large: *

..... Jay Levy (Incumbent)
..... Christopher Mendell (Incumbent)
..... Don Pearce (Incumbent)
..... Steve Goldberg
..... Tessie Nolan
..... Ralph Overturf

*Only five Directors-at-Large can be elected

Observatory Director Michael Dye

Standing Committees:

Observatory Michael Dye (also a director)
Novice George Stradley
Telescope Clayton Jeter
Field Trip &
Observing Ken Miller
Program John Blubaugh
Education Richard Nugent
Publicity Joe Khalaf
Welcoming Hannah Lange and
..... Susan Kennedy (Co-chairs)
Audit (Open)

The Nominating Committee consisted of Brian Cudnik, Susan Kennedy, Christopher Mendell, Don Pearce, George Stradley and Ed Preston, Chairman.

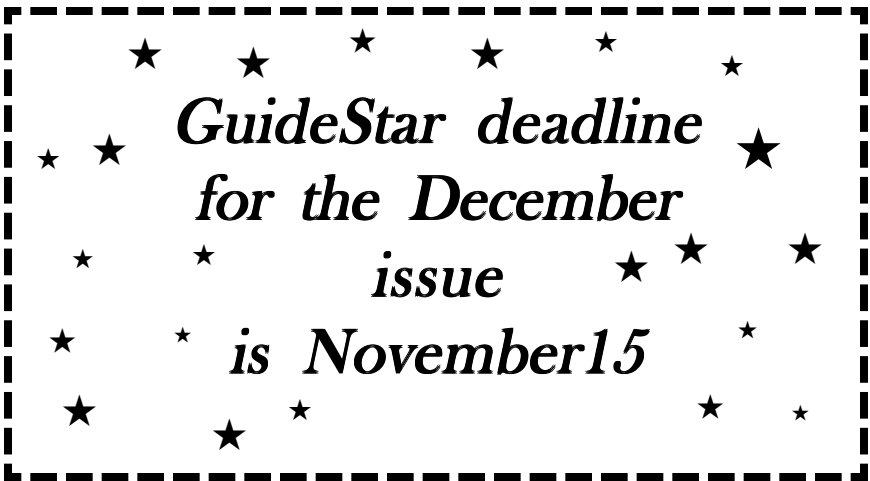
Election will be held at the November 7th General Membership Meeting.

Other Meetings...

Fort Bend Astronomy Club meets the third Friday of the month at 8:00 p.m. at the First Colony conference Center. Novice meeting begins at 7:00, regular meeting begins at 8:00. Web site: <http://www.fbac.org>

Johnson Space Center Astronomical Society meets in the the Lunar and Planetary Institute on the 2nd Friday of each month. Web site: <http://www.ghgcorp.com/cbr/jscas.html>

North Houston Astronomy Club meets at 7:30 p.m. on the 4th Friday of each month in the Teaching Theatre of the Student Center at Kingwood College. Call 281-312-1650 or E-mail bill.leach@nhmccd.edu. Web site: www.astronomyclub.org



November's Total Lunar Eclipse

by Leland Dolan

On the evening of Saturday, November 8, 2003 a total eclipse of the Moon will be visible from the Houston area. Unfortunately for us, most of the eclipse will take place with the Moon low in the eastern sky and just barely clearing the horizon as the partial phase begins. Even at the beginning totality the Moon will be only 20 degrees above the Eastern horizon. The following table gives the circumstances of the eclipse as seen from my residence in Western Houston. All times are given in Central Standard Time.



Time	Event	Alt.
5:26 PM	Moonrise	—
5:32 PM	Partial phase begins	
7:06 PM	Totality begins	20
7:31 PM	Totality ends	25
9:05 PM	Partial phase ends	45

During this eclipse, totality will last only 24.5 minutes compared to the 52.7 minutes of this past May's lunar eclipse. If you plan to time the passage of the umbra across lunar craters the optimum time will be between 7:31 and 9:05 PM.

The eclipse exits the umbra at 9:05 as totality ends, and the only visible trace of the eclipse will be a slight "smudge" at the top of the lunar disk.

Happy Observing!

Membership Renewals...

Please check the mailing label on your copy of the *GuideStar*.

It'll tell you when your membership expires. If it expires soon, please send your renewal to the address on the outside cover of *GuideStar*. The dues information is on the inside front cover.

Membership in the Houston Astronomical Society is one of the great bargains in Astronomy. For a regular membership of \$33 you get the opportunity to support an active and growing organization, you get the monthly *GuideStar* newsletter, and you get access to the outstanding H.A.S. observing site near Columbus, Texas. (You must attend an orientation, given monthly, to use the site.) And, after two months of membership you can borrow, at no charge, one of the Society's loaner telescopes. It's the best deal in town, we think. Please renew your membership when it expires.

Thanks!

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who like to be under the stars. How much longer until we complain about the cold?

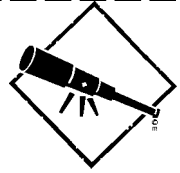
Don't forget that the election is this month. Help set the direction for the Houston Astronomical Society by participating in the selection of the club's officers.

This just in -- Mike Dye reports that *free* Internet access is available at the observatory site. Here's the plan... Take your computer to the site and convince the boss that, yes, you are at the office.

Until next time... clear skies and new moons!

..Bill

Observatory Corner



By Michael B. Dye Observatory Chairman



Back on September 12th, the Observatory Site was host to another Troop of Boy Scouts. This was Troop 468 from Pearland. The Scouts arrived on site on Friday night pitched camp and went to sleep. The next morning, after breakfast, the Scouts trimmed the trees from the power lines along the North road between the well house and the power pole by the bathrooms. Also, the rest of the dirt that was in front of the bathrooms along the North road was spread out along the Exit road

towards the Exit gate. Below is a list of everyone who was there for this activity.

Here is a list of the boys from Troop 468 who attended:

Bryson Rushing
Taylor Rushing
Jacob Barger
Jacob Williams
Alex Gonzales
Ray Daffin
Jeremy Carrette
Ian Slazinik
Iyke Iwuanyanwu
Calvin Beauchamp

The adults:

Phil Barger
Bendel Rushing
Steve Marsh
Susan Beauchamp
Don Williams
Alex Gonzales
Mannie Steglich

As chairman of the Observatory Committee, I would like to thank the boys and adults of troop 468 for all the work they did at the Observatory Site.

The next item on my agenda, is a more detailed description of the new Internet connection at the Observatory Site. Our new system consists of

Continued....

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a satellite dish, terminal and one year of airtime. Stratos Global Communications, Broadband Division, donated the hardware and the one-year of airtime. They (Stratos Global Communications) have indicated an intention to renew the airtime annually. Stratos is a Canadian company which provides a wide range of communications services, including INMARSAT, V-SAT, microwave, Iridium and mobile radio service. The Broadband Division is made up of a number of Gulf Coast companies, which Stratos acquired. These companies exist primarily to service the oil and gas industry.

Brett Miwald, who joined HAS this spring, picked up all of the equipment while he was in Lafayette, LA working at the Stratos Operations Center. Brett and Don Selle set up the system and Brett has loaned us (the HAS) his personal wireless access point (WAP) so that the system is useable until we can arrange for a permanent solution (our own access point transceiver). Kirk Kendrick is working on that activity. The WAP we are using at this time is an 802.11g and is backward compatible to 802.11b hardware. The WAP is currently mounted on the pole with the dish and terminal inside a plastic box. The transmit power is about 100 milliwatts.

Any 802.11b card for laptop or desktop should work. The WAP is currently running wide open - meaning no security, so for now anyone with a card should be able to share the Internet connection. We are currently working on making our system more secure. Brett checked the signal strength on the pads farthest from the WAP and in the camper/picnic area. The signal strength was good.

All of the users will be sharing a minimum 1 MB/sec downlink (uplink is slower due to transmit signal strength - 256k I think). It is equivalent to sharing a fairly fast DSL line. Obviously the more people on the connection at one time, the slower the download speed. There is also almost a half-second latency time for downloading to begin, since the signal must bounce off a geostationary satellite twice.

Continued....

Observatory Corner... from previous page

Upgrades to the system will consist of some or all of the following:

1. Install a permanent power source to the Satellite Transceiver. We are currently using an extension cord to an outdoor outlet on the Observatory Building.
2. Kirk Kendrick is looking into getting a more powerful WAP as a permanent solution. We are looking into setting up a server in the West Storage building (metal building East of the Observatory) which will service both a hardware LAN in the Observatory and a wireless LAN outside.
3. We are looking at getting an automated weather station that we can set up on the server so users can connect to the system and check the weather at the site. This could also include a webcam that would show the weather conditions at the Observatory Site.

I would like to thank both Don Selle and Brett Miwald for their efforts at getting this system set up.

The Society continues to benefit from members who shop at Randalls and now Kroger's. For this we (the Society) thanks you. Please link your Randalls card to the Houston Astronomical Society so that the society can benefit from the Randalls program. Our number is #6618. This is very easy to do, just go to the Courtesy Booth and tell the person there what you what to do. If you shop at Kroger, we now have a card available (at the General Meeting) that you present at the cash register when you check out. We can thank Joe Khalaf (Publicity Chairman) for his efforts in getting the cards.

Please fill out the appropriate log form when you use the site. Remember we use these forms as attendance records and to report Observatory Site problems such as broken toilets.

Logo Sales

Please note the prices for the books listed below. They are all new and will go fast on a first come, first served basis.

Observe the Herschel II Guide \$17.00
Observe and Understand the Sun \$14.00
Astronomy, The Teachers Handbook \$12.00
ALPO's Mars Observer's Handbook \$12.00
Observe Variable Stars \$17.00
Observe Eclipses \$17.00

Orders will be taken for the 16 inch Levy Planisphere. It will sell for \$24.00 prepaid.

The prices all include taxes. **All checks should be made out to HAS** for the correct amount, and mailed to Judy Dye, 12352 Newbrook, Houston TX 77072-3910. If there are any questions, please call. Our phone number is 281-498-1703.

Judy Ann Dye

Continued....

Special "Help" Volunteers

Any member who wants specific information on a subject listed below may call the individual listed. If you have a moderate knowledge of a special subject and would be happy to have others ask you about that subject, let the editor know and your subject, name and phone will be listed in *GuideStar* in the future. Note that we have listed a few possible areas where you might volunteer, but, of course, you are not limited to these. You can also have a specialty which is a sub-group of another. Note that the number of names for any subject is not limited to only one person. Also see the "Ad Hoc Committee Chairpersons" on the inside front cover and the "Special Interest Groups Listing article.

Subject	Name	Phone
Asteroids	Barbara Wilson	281-933-1289
Astrometry	Richard Nugent	713-910-5945
Astrophotography	Steve Goldberg	713-721-5077
Beginning in Astronomy	Peggy Gilchrist	281-558-1190
	Amelia Goldberg	713-721-5077
Comets	Kenneth Drake	281-367-1592
	Don Pearce	713-432-0734
Computers	Matt Delevoryas	713-795-0808
	Leland Dolan	713-688-0981
	Ricardo Palmeira	713-669-1409
Cosmology	Ricardo Palmeira	713-669-1409
Deep Sky	Larry Mitchell	281-448-8700
	Barbara Wilson	281-933-1289
Double Stars	John Blubaugh	713-921-4275
Drawing (Sketching)	Scott Mitchell	713-461-3020
Herschel Objects	Larry Mitchell	281-448-8700
History, Astro'y - General	Leland Dolan	713-688-0981
	Ricardo Palmeira	713-669-1409
History, Astro'y - Amateurs	Tom Williams	713-526-2868
Mathematics, Astronomical	Richard Nugent	713-910-5945
Messier Objects	Novice Committee (see inside front cover)	
Photometry	Open	
Radio Telescopes	John Hiatt	713-464-4010
Satellites, Artificial	Open	
Solar Observing	Larry Mitchell	281-448-8700
Spectroscopy	Open	
Thin Crescent Moons	Don Pearce	713-432-0734
Telescopes	Clayton Jeter	281-383-1337
Variable Stars	Barbara Wilson	281-933-1289
	Tom Williams	713-526-2868
Video	Larry Mitchell	281-448-8700

Observatory Duty Roster

by Michael B. Dye, Observatory Chairman

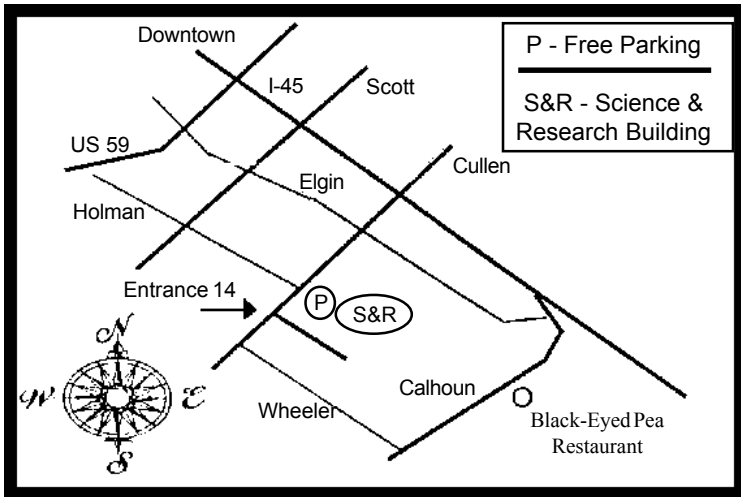
This is the duty list for November, December and January '04. If you are listed in this roster, please be sure to contact your supervisor for any information that you may need and the date and time to be at the site. You may change from site duty to open house or from open house to site duty by pre-arrangement with the Site Supervisor for that month. Changes between months require Observatory Chairman coordination.

November Supervisor Logan Rimes 713-681-5397
Margaret Nunez Site
Sim Picheloup Members Observatory Night 11-15-03
Scott Poteet Members Observatory Night 11-15-03
Leonard Raif Members Observatory Night 11-15-03
Henry Schneider Site
Larry Wadle Site

December Supervisor Robert Rogers 281-460-1573
(New Number)
Mark R. Wilson Site
Tom Williams Members Observatory Night 12-13-03
Barbara Wilson Members Observatory Night 12-13-03
Harry Wilson Members Observatory Night 12-13-03
Warren Wundt Site
Peyton Barnes Site

January Supervisor To BeAnnounced xxx-xxx-xxxx
John Blubaugh Site
Ken Carey Members Observatory Night 01-xx-04
John Chauvin Members Observatory Night 01-xx-04
Brian Cudnik Members Observatory Night 01-xx-04
Gary Delzer Site
Kay Sandor Site

Please remember that Site work can be done anytime and does not have to be done just before Members Observatory Night. Contact your Site Supervisor for details. Names are selected for Site Duty using the current Alphabetical listing for Observatory Key Holders. If any member knows of a conflict please call me before your name is listed.



General Membership Meeting

The Houston Astronomical Society holds its regular monthly General Membership Meeting on the first Friday of each month, unless rescheduled due to a holiday. Meetings are in Room 117 of the Science and Research Building at the University of Houston. A Novice Presentation begins at 7:00 p.m.. The short business meeting and featured speaker are scheduled at 8:00 p.m. Also typically included are Committee Reports, Special Interest Group Reports, current activity announcements, hardware reviews, an astrophotography slide show by members and other items of interest.

Board of Directors Meeting

The Board of Directors Meeting is held on dates scheduled by the board at 7:00 p.m. at the University of St. Thomas. Information provided to GuideStar will be published. The meetings are open to all members of the Society in good standing. Attendance is encouraged.

GuideStar Information

The H.A.S. *GuideStar* is published monthly by the Houston Astronomical Society. All opinions expressed herein are those of the contributor and not necessarily of Houston Astronomical Society. The monthly Meeting Notice is included herein. *GuideStar* is sent via bulk rate mail to Regular, Student, and Honorary Members of H.A.S., selected individuals and recent visitors to the General Membership Meeting. Contributions to *GuideStar* by members are encouraged. Electronic submission is helpful. Submit the article in ASCII text, MS-Word (preferred), or WordPerfect format via email BillP10566@aol.com. Copy must be received by the 15th of the month for inclusion in the issue to be mailed near the end of the same month. Or, bring copy to the General Membership Meeting and give it to the Editor, or phone to make special arrangements.

Editing & Production: Bill Pellerin, 713-880-8061; FAX: 713-880-8850;
 Email: Billp10566@aol.com

Reproduction and Mailing: Anne Hallman & Hannah Lange

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Houston Astronomical Society

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