

GuideStar



April, 2014

Volume 32, #4

At the April 4 Meeting

Using Technology Developed for the Central Trackers at the LHC at CERN to Provide Active Space Radiation Monitors for Astronauts

Dr. Larry Pinsky — University of Houston

The Medipix Collaborations at CERN have been spun-off to develop the active pixel detector technology used at the LHC for medical imaging applications. While UH is active in that effort, we are also



heavily involved in using the same technology to provide active space radiation dosimeters and area monitors. There are currently 6 units deployed on the ISS, and the first test of the new Orion module will carry two battery powered units, the only radiation monitors on that mission. Work is also underway to develop the operational units that will be built into the final manned Orion spacecraft. The technology is so compact and agile, that an actual device identical to the flight unit on the ISS can be demonstrated during the talk using only the laptop used to control the presentation.

The GuideStar is the winner of the 2012 Astronomical League Mabel Sterns Newsletter award.



The Houston Astronomical Society is a member of the Astronomical League.

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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.

All meetings are at the University of Houston Science and Research building. See the last page for directions to the location.

Novice meeting: 7:00 p.m.

"Finding Your Way in the Night Sky" — Rene Gedaly

See page 6 for more information

General meeting: 8:00 p.m

See last page for directions and more information.

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.

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Dues and Membership Information

Annual Dues:Regular\$36
 Associate.....\$6
 Sustaining\$50
 Student.....\$12
 Honorary..... N/C

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*. *The GuideStar*, the monthly publication of the Houston Astronomical Society is available on the web site. 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* and *Astronomy* magazines are available to members at a discount.

Membership Application: Send funds to address shown on last page 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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Other Meetings...

Johnson Space Center Astronomical Society meets in the the Lunar and Planetary Institute on the 2nd Friday of each month. Web site: www.jscas.net

Fort Bend Astronomy Club meets the third Friday of the month at 8:00 p.m. at the Houston Community College Southwest Campus in Stafford, Texas
http://www.fbac.org/club_meetings.htm.
 Novice meeting begins at 7:00 p.m., regular meeting begins at 8:00 p.m. Website:
<http://www.fbac.org>

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

Brazosport Astronomy Club meets the third Tuesday of each month at the Brazosport planetarium at 7:45 p.m. The Brazosport planetarium is located at 400 College Boulevard, Clute, TX, 77531. For more information call 979-265-3376

★ ★ ★ ★ ★
GuideStar deadline ★
 ★ for the May ★
 ★ issue ★
 ★ is April 15th ★
 ★ (tax day) ★
 ★ ★ ★ ★ ★

President's Message

by Bill Pellerin, President

HAS Board Meeting, March 19

- **Video recording of HAS Presentations** — The board agreed to fund the purchase of equipment to upgrade our audio system and to establish a capability for making video recordings of meetings and events. The HAS could post, for example, a welcome to the HAS message video on the web site as well.
- **Colorado County Tax Status**—Thanks to the help of HAS member Scott Mitchell the HAS has re-established our non-profit status with the Colorado County taxing authority. With this in place, the organization is not liable for property taxes for 2013 and beyond.
- **Move July 4 meeting to July 11** — The board voted to recommend to the membership that the July 4 meeting of the HAS be moved to July 11 to avoid conflicts with the July 4 holiday.
- **New member packet** — VP Rene Gedaly is beginning work on updating the new member packet, possibly as an online resource.
- **HAS Banners** — The board is considering funding the purchase of banners to be displayed at public events to improve the visibility of the HAS.
- **Founder's Day Event** — The board discussed the status of the upcoming Founder's Day Event on March 29.
- **Texting service** — The board approved moving ahead with a texting service. The service will be used to provide the membership with time-sensitive information (status changes for HAS meetings, status of public star parties, status of events at the observing site, etc.)

Arboretum Star Party

The March 22 Arboretum Star Party was marred by cloudy skies, but rescued by coordinator Bill Flanagan's presentation of what the sky *would* look like if it were clear. He used Stellarium for this purpose. In addition, those of us who brought telescopes in hope that the skies would clear set them up and talked about how the various types of telescopes functions. The collection included a refractor, a Dobsonian (Newtonian) reflector, a reflector on a German equatorial mount, and a Schmitt-Cassegrain on a German equatorial mount.

Following the presentations Bill Flanagan and I discussed with Arboretum staff opportunities for further partnerships.

We have another star party scheduled at the Arboretum in April on the night of the Pink Moon.

Founder's Day Event

The Founder's Day Event on Saturday, March 29, was well attended and was a great success. Those HAS members who organized and executed the event did an outstanding job. There's an article and a few photos from this event in this issue of the *GuideStar*.

Cheers,

..Bill Pellerin

President

Observations... of the editor

by Bill Pellerin, GuideStar Editor

The Brave New World

Things are happening faster than I anticipated. When I first started in this hobby observing meant going out to the HAS site, setting up my 10" Coultter Dobsonian telescope (which took all of 5 minutes) and star hopping to the various objects that comprise the Messier list. I got my Astronomical League Messier list certificate in 1999.

Before too long, there were Schmitt Cassegrain telescopes on alt-az mounts with motors and electronics. The combination of the motors and electronics found objects in the sky and followed those objects as the earth rotated beneath them.

Equatorial mounts, German equatorial mounts were (and still are) common and manual guiding were used to take film-based images of objects in the sky.

Now, I wonder if I need to own a telescope any more. There are so many ways that I can get images of night sky objects without the expense and bother of setting up a telescope.

A simple search of Google Images will provide me with a selection of images of practically any object I want. Do I want a picture of the object taken in infrared from the Spitzer Space Telescope, in visible light by the Hubble Space Telescope, or from a ground based telescope, perhaps owned and operated by an amateur imager? They're all available.

Perhaps more important, I can get images taken on demand from various on-line telescopes. With little experience required I can queue up observations to be done on a telescope in New Mexico or Australia and simply wait for my image to show up. These images can be used for photometry, astrometry, supernova searches, or simply to satisfy my desire to have a photo that I can hang on the wall.

None of this is to discount the experience of being under a night sky or the experience of seeing an object 'live' through the eyepiece. I have said before that one of my best observational experiences is seeing the Milky Way galaxy arching across the sky from the Prude Ranch at the Texas Star Party.

I have no plans to dispose of my primary telescope and mount, but I do recognize that my ability to use this equipment is limited by several factors including sky conditions, moon phase, other personal commitments, and so on.

I can queue up observations on remote telescopes today and retrieve my observations tomorrow (assuming clear skies) or the next day, or the one after that. The time required to queue up these observations can be quite short especially compared with the time that it takes to make the observations myself.

So, I'm straddling the two worlds right now — the world in which I am the telescope operator, making my own observations, and the world in which I'm a client of telescopes that others have set up and maintained. I should add, quickly, that most of the online telescopes charge the user for telescope time. There's no free lunch, as they say.

There's no free lunch for acquiring the equipment and doing the work yourself either.

So, the future of observing may not be the future we anticipated. We may have to say that our old future is gone. Not immediately, of course, things change slowly.

Until next time...

clear skies and new moons!

..Bill

April's Total Eclipse of the Moon

By Leland A. Dolan

A couple of minutes before 1 a.m. on the morning of Tuesday, April 15, 2014, the Moon begins its passage into the Earth's full shadow, known as the *umbra*. Around this time you will note a grayish "smudge" covering part of the Moon's eastern edge. This is the *penumbra*, which

Houston area:

To help those unfamiliar with the concept of "azimuth", I have listed not only the azi-

imuth in degrees, but also the approximate compass direction of the Moon for the each phase of the eclipse. This direction is only an approximation, but if high buildings, or large trees are blocking your view, you will know in which direction to look for the (apparently) "missing" Moon.

Eclipse phase	Time <i>CDT</i>	Altitude Deg.	Azimuth	
			Deg.	Compass Dir.
Moon enters umbra	12:58 a.m.	50	172	South
Totality begins	2:07 a.m.	48	198	South
Mid-eclipse	2:46 a.m.	45	210	Southwest
Totality ends	3:25 a.m.	40	221	Southwest
Moon leaves umbra	4:33 a.m.	29	236	Southwest



Chart generated by TheSkyX © Software Bisque, Inc. All rights reserved. www.bisque.com

surrounds the umbra. Now the darker umbra sweeps slowly across the Moon from East to West, until by 2:07 a.m. the Moon is completely covered by this shadow. This stage marks the beginning totality. For this particular eclipse, totality lasts an hour and eighteen minutes, or if you prefer, seventy-eight minutes.

The table (above) lists the times of each phase of the eclipse (in Central Daylight Time), as well as the altitude and azimuth of the Moon, for the

By the way, the altitude and azimuth directions are useful, only for the Greater Houston area and would not be that helpful if you went to the Big Bend area, where you might have to wait for the Moon to "come over the mountain" J to see the early phases of the eclipse. The timing of these events would still be correct for any place that uses Central Daylight Time.

Novice Presentation—April, 2014

Finding Your Way in the Night Sky

By Debbie Moran

Rene Gedaly will be the speaker for April with a talk that should not be missed if you are new to astronomy: *Finding Your Way in the Night Sky*. She will cover everything from simple planispheres to charts and coordinate systems and also as a bonus we will learn her shortcut for visualizing the celestial sphere coordinates when you are outside.

Rene says she was frustrated that when she stepped out into the night sky, she couldn't see right ascension and declination. Surely there must be a way to see the celestial sphere when she walked out into her

backyard. Happily she found out how and now you can, too.

In May, we welcome back Bill Spizzirri who will talk about a past trip to visit the Mauna Kea Observatories in Hawaii, a popular bucket list trip for any amateur astronomer.

Founder's Event

March 29, 2014

By Bill Pellerin, GuideStar Editor

The Founder's Day Event was on March 29. I hope to have more photographs and more to report in next month's *GuideStar*.

The event was very well attended, with well over 100 people on site. Some brought telescopes in anticipation of the Messier Marathon that night and others brought telescopes in order to work on other observing programs.

One of the first things I noticed was the personal observatories going up at the observing site. Don Selle and Mike Edstrom are two of the first subscribers to the personal observatory program and they are getting close to having operational roll-off roof observatories in place.

The photo to the right is of Don's observatory. Mike's is of similar design but a bit further along in construction.

Each site is provided with an electrical box and each site is on its own circuit breaker.



Steve Fast provided a site orientation to attendees who were new to the site or who had not completed a site orientation in the past.

Larry Mitchell (right) brought out his 36" Obsession telescope and assembled it for later use.

At about 4:15 the presentations began in front of the assembled group. Allan Parker and John Hiatt talked about establishing the observatory site and the large roll-off roof observatory still enjoyed by HAS club members. Their presentation was followed by a presentation by Dr. David Lambert, the director of the UT McDonald Observatory. The photo below shows David speaking and other program participants.

David talked about his career in astronomy, in particular his tenure at UT, the history of



Photo by Lori Valencic

the McDonald Observatory (which is celebrating its 75th anniversary), and the contributions of amateurs to astronomy, in particular those contributions of variable star observers.

His talk was followed by remarks from our observatory chairman, Mike Edstrom, who was then followed by Steve Goldberg who presented the historical plaque to the HAS. This plaque will be permanently placed in the on-site observatory. (The text of that plaque is on the next page in this *GuideStar*.)

The second presentation was a plaque containing the names of all past observatory chair holders. The past chair holders present at the event were recognized.

This was followed by the presentation of a Master Observer plaque identifying all HAS members who have achieved the status of Astronomical League Master Observer.

Brian Cudnik was presented with a plaque commemorating his observation of an meteor impact on the moon, Ed Szczepanski was not present, but an award for his discovery



(Continued on page 8)

Memorial to Houston Astronomical Society's Dark Site Founders

In 1976, the near completion of the 12.5-inch f/5 club telescope encouraged the HAS membership to approve construction of an HAS observatory at a suitable dark site. Fred Garcia, Art Ciampi and the Telescope Committee completed the telescope in 1979, so active planning of an observatory began under the leadership of Committee Chairman, Allan Parker, assisted in the earliest stages by John Hiatt, Larry Wadle and Tom Williams, with Ciampi acting as a liaison to the telescope committee. Tom Williams paved the way for the observatory by leading the effort to incorporate the HAS and then obtain the Society's status as an exempt organization under the federal tax code. This made it possible to solicit public donations for the project. Light pollution studies by Wadle concluded that a site near Columbus, Texas would remain dark for at least 20 years. Parker prepared and presented a formal proposal to Walter Fondren III. After visiting the proposed site with the committee, Mr. Fondren arranged for a perpetual lease of 18 acres on his family's ranch to the Society. Mr. Fondren also donated substantial matching funds to aid the Society's development of the site.

Parker and Hiatt then prepared detailed plans for the site and an observatory building. The building design included a large window at the south end to accommodate the f/5 telescope on its low mounting in addition to a Celestron 14-inch and a second 12.5 inch f/7 Cave Astrola telescope. Site clearance and construction of the building by Parker, Hiatt, and many other HAS members was aided substantially by the Durwood Green and Parker Brothers construction companies. A sophisticated electro-mechanical system designed and constructed by Dan Morrell controlled the movement of a massive roll-off roof fabricated and installed by Parker Brothers Construction. A windlass system and continuous cable that actually moves the roof was designed by Marvin Morris. The roof and control system still operate smoothly after 30 years. Lee Eakins installed the building's electrical wiring. John Arnold arranged for the donation of the essential building air conditioning system by the Carrier Corporation.

After construction of 22 separate observing pads with a central electrical service, the Society dedicated the Dark Site on October 15, 1983. Dr. Harlan Smith, Director of the University of Texas McDonald Observatory, provided the keynote address of congratulations to the Society and the many members who contributed to the project. Over 100 members and their guests attended the dedication ceremony at the site.

This memorial plaque honors Allan Parker, John Hiatt, and the many others, named and not named above, who contributed their labor and/or donated funds to support the development of the HAS Dark Site. HAS will preserve the results of their vision and dedicated effort for the generations to come.

Dedicated March 29, 2014.

(Continued from page 7)

of a comet at the HAS site was presented. Finally, Larry Mitchell was presented with a plaque for discovering a supernova.

Mike Edstrom, our current observatory chair, spoke about Bob Rogers, our long-term observatory chair, who passed away last year. He then opened up the memorial Bob's Dream Observatory designed to provide an opportunity for HAS members to learn the imaging process.

At 6:00 dinner, prepared by Don Selle, was served. The meal included spaghetti, tomato sauce, meatballs, and salad. For desert, there were two large sheet cakes each of which was decorated to be a map of the HAS Observatory site.

The Founder's Day event was, by all accounts, a huge success. The credit for this success goes to the observatory committee who planned and executed the event. More about this next month.



M13—taken during the Messier Marathon, March 29-30. Photo by Jeff Hartgerink

Old Tool, New Use: GPS and the Terrestrial Reference Frame

By Alex H. Kasprak

Flying over 1300 kilometers above Earth, the Jason 2 satellite knows its distance from the ocean down to a matter of centimeters, allowing for the creation of detailed maps of the ocean's surface. This information is invaluable to oceanographers and climate scientists. By understanding the ocean's complex topography—its barely perceptible hills and troughs—these scientists can monitor the pace of sea level rise, unravel the intricacies of ocean currents, and project the effects of future climate change.

But these measurements would be useless if there were not some frame of reference to put them in context. A terrestrial reference frame, ratified by an international group of scientists, serves that purpose. "It's a lot like air," says JPL scientist Jan Weiss. "It's all around us and is vitally important, but people



Artist's interpretation of the Jason 2 satellite. To do its job properly, satellites like Jason 2 require as accurate a terrestrial reference frame as possible. Image courtesy: NASA/JPL-Caltech.

don't really think about it." Creating such a frame of reference is more of a challenge than you might think, though. No point on the surface of Earth is truly fixed.

To create a terrestrial reference frame, you need to know the

distance between as many points as possible. Two methods help achieve that goal. Very-long baseline interferometry uses multiple radio antennas to monitor the signal from something very far away in space, like a quasar. The distance between the antennas can be calculated based on tiny changes in the time it takes the signal to reach them. Satellite laser ranging, the second method, bounces lasers off of satellites and measures the two-way travel time to calculate distance between ground stations.

Weiss and his colleagues would like to add a third method into the mix—GPS. At the moment, GPS measurements are used only to tie together the points created by very long baseline

NASA Space Place

interferometry and satellite laser ranging together, not to directly calculate a terrestrial reference frame.

"There hasn't been a whole lot of serious effort to include GPS directly," says Weiss. His goal is to show that GPS can be used to create a terrestrial reference frame on its own. "The thing about GPS that's different from very-long baseline interferometry and satellite laser ranging is that you don't need complex and expensive infrastructure and can deploy many stations all around the world."

Feeding GPS data directly into the calculation of a terrestrial reference frame could lead to an even more accurate and cost effective way to reference points geospatially. This could be good news for missions like Jason 2. Slight errors in the terrestrial reference frame can create significant errors where precise measurements are required. GPS stations could prove to be a vital and untapped resource in the quest to create the most accurate terrestrial reference frame possible. "The thing about GPS," says Weiss, "is that you are just so data rich when compared to these other techniques."

You can learn more about NASA's efforts to create an accurate terrestrial reference frame here: <http://space-geodesy.nasa.gov/>.

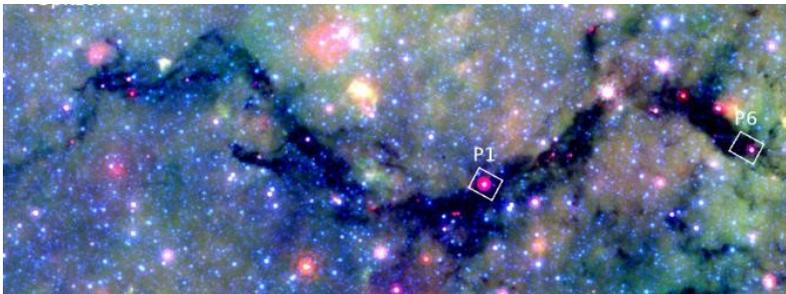
Kids can learn all about GPS by visiting <http://spaceplace.nasa.gov/gps> and watching a fun animation about finding pizza here: <http://spaceplace.nasa.gov/gps-pizza>.

Submillimeter Array Unveils How Small Cosmic Seeds Grow into Big Stars

Harvard-Smithsonian Center for Astrophysics (CfA) <http://www.cfa.harvard.edu/news/2014-04>

Cambridge MA — New images from the Smithsonian's Submillimeter Array (SMA) telescope provide the most detailed view yet of stellar nurseries within the Snake nebula. These images offer new insights into how cosmic seeds can grow into massive stars.

Stretching across almost 100 light-years of space, the Snake nebula is located about 11,700 light-years from Earth in the direction of the constellation Ophiuchus. In images from NASA's Spitzer Space Telescope it appears as a sinuous, dark tendril against the starry background. It was targeted because it shows the potential to form many massive stars (stars heavier than 8 times our Sun).



"To learn how stars form, we have to catch them in their earliest phases, while they're still deeply embedded in clouds of gas and dust, and the SMA is an excellent telescope to do so," explained lead author Ke Wang of the European Southern Observatory (ESO), who started the research as a predoctoral fellow at the Harvard-Smithsonian Center for Astrophysics (CfA).

The team studied two specific spots within the Snake nebula, designated P1 and P6. Within those two regions they detected a total of 23 cosmic "seeds" - faintly glowing spots that will eventually birth one or a few stars. The seeds generally weigh between 5 and 25 times the mass of the Sun, and each spans only a few thousand astronomical units (the average Earth-Sun distance). The sensitive, high-resolution SMA images not only unveil the small seeds, but also differentiate them in age.

Previous theories proposed that high-mass stars form within very massive, isolated "cores" weighing at least 100 times the mass of the Sun. These new results show that that is not the case. The data also demonstrate that massive stars aren't born alone but in groups.

"High-mass stars form in villages," said co-author Qizhou Zhang of the CfA. "It's a family affair."

The team also was surprised to find that these two nebular patches had fragmented into individual star seeds so early in the star for-

mation process.

They detected bipolar outflows and other signs of active, ongoing star formation. Eventually, the Snake nebula will dissolve and shine as a chain of several star clusters.

These results will be published in the *Monthly Notices of the Royal Astronomical Society*. The paper is available [online](#).

Headquartered in Cambridge, Mass., the Harvard-Smithsonian Center for Astrophysics (CfA) is a joint collaboration between the Smithsonian Astrophysical Observatory and the Harvard College Observatory. CfA scientists, organized into six research divisions, study the origin, evolution and ultimate fate of the universe.

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This content distributed by the

AAVSO Writer's Bureau

Observatory Corner

By Mike Edstrom, Observatory Committee Chairman

"Bob's Dream" Observatory Now Open

And now for the unveiling—here is the new Bob Roger's Astrophotography Observatory "Bob's Dream". This was officially opened at the "Founder's Day" event on March 29th by his family. We will soon announce the first training date for its use.



And the Work Goes On

I **need** to remind everyone that we need to start filling out Log Reports at the site so I can give this information to the Fondren Foundation. The property is on a 99 year lease and part of the Lease agreement is that HAS needs to report every year to the Fondren Foundation that the property is being used. The Log Reports are located in the box in the middle of the field. Just open the cover, fill out the report and then slide it into the slot that is in the inside of the cover and then close the box. It is very important that everyone fill out a Log Report so that we are showing that the Observing site is being used. Your help on this is very much appreciated.



If you have a Randalls card, and have not done so, please have it coded for the Houston Astronomical Society. Our number is #6618. The Society gets 1% of the gross sales that member spends at Randalls. Randalls totals up the amount spent each quarter and will send us a check if the amount goes over \$2,500, otherwise the total roles over to the next quarter of zeros out at the end of the calendar year. So please link your Randalls card to the Houston Astronomical Society so that the society can benefit from this 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 want to do.

If you have any suggestions or thoughts for the site, please let me know.

Mike Edstrom

medst22531@msn.com

Kids Outreach & Public Star Parties

Tents In Town - Urban Camp

April 5, 2014, 8-10pm (estimated)
Zindler Park, 7008 South Rice, Bellaire, TX 77401
Expected visitors: 300

Fathers and Flashlights (Cypress) - Urban Camp

April 5, 2014, 8-10pm (estimated)
Pope Elementary, 19019 N Bridgeland Lake Pkwy, Cypress, TX 77433
Expected visitors: 300

Houston Arboretum - Pink Moon

A party mostly for observing the Full Moon (rising above the trees around 8:15 pm), with our guests at the Arboretum. Also Jupiter, and maybe some of the brighter clusters (Pleiades) may be available.
April 12, 2014, 8:30 PM - 10:30 PM
Houston Arboretum, 4501 Woodway Drive, Houston, TX 77016

HAS Texas 45 observing program

From Novice to Olympian...

By Rene Gedaly — HAS Texas 45 Program Coordinator

There's nothing like the enthusiasm of a novice with a new scope and observing project to inspire your own observing.

One such novice was talking to me about the Texas 45. He'd already completed the program but wasn't sure he wanted to take the award pin and certificate yet. After observing 65 objects, mostly using his go-to scope, he wanted to start the list over, this time star hopping it.

"I was considering re-doing the 45 via star-hop. The GoTo method I used was a great intro to my scope and the variety of objects I could view. At the time I wondered how anybody could find them without such technology. Now I feel I should test my newly developed skills."

How inspiring! But why not take the award pin and certificate now, I told him. When he finished star hopping the list, he'd be awarded a new certificate, one that reflected his new accomplishment. In the meantime the pin would be his to wear proudly.

HAS Texas 45 award levels

When you complete the Texas 45 at any level, you will be presented an award pin and certificate. The certificate will reflect the number of objects you viewed and your method of observation. You can stop there, or you can continue on to another level. Complete it, and you'll be awarded an additional certificate. Award certificates come in three levels: bronze, silver and gold.

Bronze Award

Observe 40 of 60 list objects, 10 objects per season, plus 5 solar system objects of your choice. Observations must be made at the HAS Observatory & Dark Site. At this level, you may use go-to telescopes or other electronic finding aids.

Silver Award

Two paths will get you a silver award certificate, S1 for star hoppers and S2 for those who want to complete the entire program:

S1. Observe 40 of 60 list objects, 10 objects per season, plus 5 solar system objects of your choice. Observations must be made at the HAS Observatory & Dark Site. All observations must be made using the star hopping method.

S2. Observe all 60 list objects plus 5 solar system objects of your choice. Observations must be made at the HAS Observatory & Dark Site. You may use go-to telescopes or other electronic finding aids.



Gold Award

Go for the gold! Observe all 60 list objects plus 5 solar system objects of your choice. Observations must be made at the HAS Observatory & Dark Site. All observations must be made by star hopping. Object sketching is encouraged but not required. This is an advanced level of accomplishment that is great preparation for any observing program of the astronomical league.



Coming soon...

Watch this column for another twist on the Texas 45, the Binocular 45! If you are trying to learn the skies, binoculars are a great way to go. And as you develop your skills, you'll find very few objects on the Texas 45 list that elude a pair of handheld binoculars under dark skies. With this program you will also earn the Texas 45 pin and certificate, but because the emphasis is on learning the skies, more guidance on finding objects will be provided.

For details about the HAS Texas 45 observing program, see the programs section of the HAS website: <http://astronomyhouston.org/programs/has-texas-45>.

Rene Gedaly
HAS Texas 45
Program Coordinator

Shallow Sky Object of the Month

Events in the Sky

By Bill Pellerin, GuideStar Editor

This month, rather than identify a single object to observe, I'm going to go over some events that you should not miss. One of these events occurs on the night before our monthly HAS meeting. Let's begin:

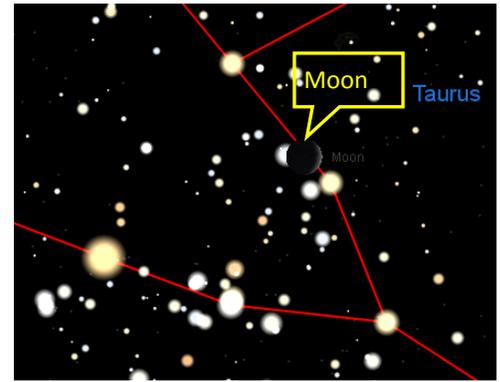
April 3: The moon will be a waxing crescent and it will go through the Hyades cluster early in the evening. Let's examine the timing of these events so we'll all be ready to observe this. The Moon, at almost 19% illumination, crosses the meridian at 4:48 p.m. in Houston; the Sun will wait until 7:41 p.m. to set. It'll take some time for the sky to get dark enough to see some stars and nautical twilight (when the Sun is 12 degrees below the horizon) begins at 8:34 p.m. We can expect that at this time a few bright stars will be visible. Also, at this time the Moon will be almost 39 degrees above the western horizon. It'll be a good time to look at the moon with binoculars or a wide-field telescope and try to see some of the stars of the Hyades cluster.

The Hyades cluster is the set of stars that form the head of Taurus the Bull.

At about 22:30, the moon will occult Delta¹ Tau, but by then the moon will only be 13 degrees above the horizon.

April 8: Mars is at Opposition. This means that Earth is on a line between the Sun and Mars. Mars is usually closest at opposition but it'll be slightly closer on April 14th this year. Mars will appear at 15.2 arc seconds on the sky. Considering that the Moon is 30 arc minutes on the sky, Mars will be less than 1% of the size of the Moon. A magnification of over 100 will be required to see Mars in a telescope as large as the Moon with the unaided eye. Mars is often a disappointment to new observers — it's small and its surface features are difficult to see if the seeing is the less than perfect. Still, this will be your best chance to see the red planet close up until the next opposition of Mars in May of 2016. The best opposition in recent history was in 2003 when Mars was 25.1" on the sky. In 2018, Mars will get to 24", but we have a good long wait for that opposition.

April 14: Full Pink Moon. There's an Arboretum star party scheduled on April 12 to celebrate the Full Pink Moon, but the *real* full moon won't happen until a couple of days after that. The Pink Moon is supposed to be associated with the blooming of the wild phlox (flowers). Don't expect the moon to be pink, however. That said, you may find the moon turning orange during the total lunar eclipse (see below). This is because the light through Earth's atmosphere looks red from the Moon's point of view, for the same reason that the sky looks red to us earthlings at sunrise and sunset — the sunlight has to travel through a lot of atmosphere before it gets to our eyes and the blue light is scattered (dispersed) leaving only the red light for us to see.



Moon through the Hyades at 10:30 p.m. on April 3, 2014

Star charts generated by TheSkyX © Software Bisque, Inc. All rights reserved. www.bisque.com

April 14-15: Total Lunar Eclipse. These occur when the Earth blocks sunlight from reaching the Moon. That is, the shadow of Earth falls on the Moon. A lunar eclipse can only occur at full Moon, and the Moon will seem to 'almost' disappear. Look for Mars near the Moon during the eclipse. See Leland Dolan's article on this event in this issue.

April 22: Lyrid meteor shower peaks. Meteor showers are always difficult to predict, but the Lyrid shower is one of the weaker showers of the year. It's always best to look at meteor showers in the morning since the Earth is moving into the shower. Don't expect a great show, but if you're at a dark site you might get a good surprise.

Parking at the University of Houston Main Campus

For the monthly Houston Astronomical Society Meeting

The large-scale map at the right shows the location of the 15F parking lot, on the west side of Cullen Boulevard.

The detail map (below) was provided by the University of Houston Parking department to define the area that is available for parking while attending the Houston Astronomical Society monthly meeting. This parking is available from 6:30 p.m. until 10:00 p.m. on the Friday night of the HAS meeting (usually the first Friday of the month).

This parking is free. If you get a notice from the UH campus police on the night of the meeting, call the UH Security office and let them know that this area has been made available on HAS meeting night by the Parking Department.



From Google Maps



Houston Astronomical Society

P.O. Box 20332

Houston, TX 77225-0332

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 or a conflict with other events at the University of Houston.

Board of Directors Meeting

The Board of Directors Meeting is held on dates and at locations scheduled by the board. 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 available on the HAS web site to all members of H.A.S., and to persons interested in the organization's activities. Contributions to *GuideStar* by members are encouraged. Electronic submission is helpful. Submit the article in text, MS-Word format via email BillPellerin@sbcglobal.net. Copy must be received by the 15th of the month for inclusion in the issue to be available 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.

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The Houston Astronomical Society welcomes you to our organization. The HAS is a group of dedicated amateur astronomers, most of whom are observers, but some are armchair astronomers.

The benefits of membership are:

- Access to our 18 acre observing site west of Houston -- a great place to observe the universe!
- A telescope loaner program -- borrow a HAS telescope and try observing for yourself!
- A monthly novice meeting, site orientation meeting, and general meeting with speakers of interest.
- Opportunities to participate in programs that promote astronomy to the general public (such as Star Parties at schools)
- A yearly all-clubs meeting for Houston area organizations
- Meet other amateurs and share experiences, learn techniques, and swap stories

You're invited to attend our next meeting.

You'll have a great time.

Houston Astronomical Society

Meeting on Friday, April 4, 2013

7:00 Novice Meeting, room 116 Science & Research 1 Bldg

8:00 General Meeting, room 117 Science & Research 1 Bldg

University of Houston

Directions to meeting:

From I-45 going south (from downtown)

- exit at Cullen Boulevard
- turn right on Cullen
- turn right into the parking lot (past the parking garage)
- Science and Research is across the street (2nd building back)

From I-45 going north (from NASA/Galveston)

- exit at Cullen Boulevard
- turn left on Cullen
- turn right into the parking lot (past the parking garage)
- Science and Research is across the street (2nd building back)

Parking:

There is Free Parking. See Parking map and detailed information on parking on the preceding page.