February 2007

The Observer

East Valley Astronomy Club

Volume 21 Issue 2

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From the Desk of the President
by Claude Haynes 2007 EVAC President

"Oh, my God!" – a gasp of wonder at seeing Saturn through the eyepiece of the Gilbert Rotary Centennial Observatory telescope. It's a common exclamation heard several times each evening as visitors react to the beauty of celestial objects. We have all had those moments at the eyepieces of our own telescopes, and it's why we volunteer at star parties; to share that exhilaration of a new pair of eyes viewing the heavens in a new way. I have often felt that same sense of wonder in the photographs of Jon Christensen. A number of them enliven the EVAC web site. The color and detail are stunning. Join us at the February meeting as Jon displays some of his photographs and discusses the process of astrophotography. And keep savoring those "Oh, my God" moments.

EVAC is currently looking for volunteers. First and foremost, we need a member to serve on the Board of Directors. Next, we need someone to chair the organizing committee for the 2007 All-Arizona Star Party, to be held on the weekend of October 12 -14 at the usual Farnsworth Ranch site. We could also use someone to champion the organization of Astronomy Day (April 21) activities at GRCO.

Contact me if you are interested in any of these opportunities.

president@eastvalleyastronomy.org

The Backyard Astronomer
Get Binoculars! *by Bill Dellinges*

About every five years I feel compelled to expound on the virtues of binoculars. Since my last article on this subject was April 2002, you are due for a booster shot. Why would you want binoculars? Allow me to explain. The typical stargazer may not always realize it, but she/he spends much time peering into an eyepiece using only one eye and viewing a chunk of space about ½ degree in diameter – about the size of the full moon. There are two problems with that: nature intended us to see things using two eyes. One eye can work, but two make for a more comfortable and enjoyable view. Secondly, while high power views of objects in a small field have their place in astronomical observation, there comes a time when one needs a much larger field than a telescope can provide to enjoy large clusters like the Hyades, Pleiades, the Coma Cluster (MEL 111), the Belt and Sword of Orion, or the Perseus OB Association, to name a few. Also rewarding in a large field of view are patches of the Milky Way, comets, and the Andromeda Galaxy. A pleasant experience is to sit on a stool and pan the southern sky through tripod mounted binoculars. You will be surprised how many things you'll discover that you never noticed before using such a technique.

Another advantage of binoculars is to help find ob-

(Continued on page 2)

(Continued from page 1)

jects in your telescope (unless, of course, you have a GOTO!). Though a viewfinder is like a binocular (1/2 of one), the view is inverted and you're using only one eye. This results in an 8x50mm viewfinder being less efficient than a 7 or 8 power 50mm binocular to scan the sky for faint fuzzies. So find them first in your binoculars and note the field around your target. It then will be easier to use your finder to pinpoint the object.

Now that I've talked you into acquiring them, what should you look for in shopping for a pair? Well, my previous article ran 4 pages in two parts! This will be a briefer primer. First, one should know that in a 7x50 binocular, the first number is the power, or magnification. The second number is the diameter of the front lenses (or objectives) in millimeters. So the above example tells us we have a 7 power binocular with 50mm lenses. As 25.4mm equal one inch, its lenses are about two inches in diameter. Before going on, and since we're playing with numbers, let's look at a few parameters associated with binoculars. If power is divided into aperture, we get the exit pupil size. Thus our 7x50 has an exit pupil of about 7mm (50/7 = 7.14mm). This matches the pupil size of the dark adapted human eye, which is why this configuration was chosen in the first place for use at night or in low light situations. At day, when the pupil is only 2-3mm, a 7x35 (5mm e.p.) or better yet, 8x32 (4mm e.p.) will suffice. Two other numbers are of interest, apparent and real field. The latter is how much sky you're actually seeing. This can vary as to the manufacturer's wishes or purposes. Usually a binoculars' real field will run from about 6 degrees to as much as 9 degrees in wide field pairs, with 6 or seven degrees being common. So let's say we have 7x50's with a real field of 6 degrees. To find their apparent field, or how wide the view is inside the binoculars, multiply power times real field: 7X6 = a 42 degree apparent field. This is somewhat narrow, as you wouldn't want an eyepiece with only a 42 degree apparent field, would you? But in binoculars, it's common. Still, a larger apparent field would be desirable, say, around 50 degrees or so. My 8x50 Swarovski has a real field of 7 degrees and apparent field of 56 degrees. I find the wider apparent field offers a far more pleasant view.

What else should we look for? Perhaps the most important factor is to stick with a brand name, like Nikon, Leica, Zeiss, Minox, Fujinon, Celestron, Orion, Adlerblick, Swarovski, Pentax, Swift, etc. Next, I'd avoid anything under $150. The view through them should be clear with no eye strain. The feel in your hands is important – are they comfortable to hold? Is the focusing smooth (not too loose or too tight)? You'll want to make sure they are "fully multi-coated", not just "multi-coated" or "coated." Twist-down eyecups are nice rather than fold-down rubber cups. Make sure they are tripod adaptable. The prisms should be Bak-4 rather than Bk-7 glass. Good edge of field sharpness is a positive but note that no binocular can produce pinpoint stars right to the field's edge. That's just the nature of the beast with binoculars; even the best short focal ratio instruments will show some coma near the field's edge. But some have better edge correction than others! Many binoculars are nitrogen purged (air pumped out, nitrogen pumped in) to avoid internal fogging in cold temperatures – a plus. Shopping, you'll quickly learn there are two basic types of binoculars, porro and roof prism. Porros have the typical bulge on either side whereas roof's look like two tubes stuck closely to one another; birders prefer roofs as they're more compact for field use . Either will be fine for astronomy. But note roofs are generally more expensive. Size? The standard astronomy model is the venerable 7x50. Other popular sizes are the 10x50 (a little more power), 9x63 (a little more aperture), 10x and 16x70, 20x80, and monster 20x and 25x 100mm! Anything larger than 70mm will need to be on a tripod. If hand held, keep in mind most people can't hold a binocular steady that's over 10 power. Any power binocular is hard to hold still, but the point here is the higher the power, the worse the "jiggle" factor. Speaking of jiggling, you may want to consider the new Image – Stabilized binoculars on the market, high tech and pricey, they actually work! (See S&T July 2000, p. 59 for a Canon review).

Where to buy? Your local camera or telescope store may stock a line of binoculars. On the net, give these vendors a try: eagleoptics.com, buytelescopes.com and oriontelescopes.com. Don't be afraid to consider imports from China. They recently have been producing good, reasonably priced binoculars and many brand name companies have switched production to China; for example, the Celestron Ultima line is now made in China and called the Ultima DX model – resulting in lower prices. For reviews of binoculars, see: cloudynights.com and betterviewdesdired.com. Recommened articles: Thoughts on Choosing Binoculars for Astronomy (Adler), S&T 9/02, p. 94. My Favorite Binoculars for Astronomy (Cook), S&T 4/97, p.46. Everything you need to know about Binoculars (Harrington), Astronomy 6/01, p.68. Consider the Humble Binocular (Dickinson), Backyard Astronomer's Guide, p.20.

If you have binoculars, you know how great they are. If you don't have binoculars, I hope the above primer will pique your interest in them. They're a pretty nifty invention when you think about it - two miniature telescopes of lenses and prisms clamped together! You haven't lived till you've scanned the night sky with them.

Milestones in Robotic Solar System Exploration

by Laurice Dee, Ph.D.

Special Gathering in Surprise

I attended a birthday bash almost two weeks ago. It was held at a large park, where numerous visitors got to enjoy the sunny, mild weather. Seven family members (that my family and I have been friends with for many years) celebrated their "age milestones". The oldest turned 75 this year, and the youngest, 10 years. The food and fellowship turned out to be quite fabulous. We spent the day talking and visiting that the time flew by so fast!

Before we knew it, it was getting a little dark outside. The Sun had already set, and our Moon, in her full-moon phase, rose over the east horizon. The shining reflection cast on the large pond from our Moon's beautiful glow was quite awesome!

While I was gazing at the colorful hues from the sunset and the rising of our Moon, I thought about some of the robotic solar system missions that are currently in space. Like the folks that just celebrated their age milestones, these missions were able to achieve their own milestones. I could not help but marveled at what the missions have accomplished since their beginnings here on Earth. I would say that each one of them has come a long way during its time in space!

Mission Milestones

I will discuss briefly the milestones for each of the following missions that I had thought about during that evening at the park. Some of their milestones were quite simple and straightforward, and others were so "out of the world". In other words, we'd never imagine that such milestones would ever occur for some of the missions.

SOHO

http://sohowww.nascom.nasa.gov/

The Solar and Heliospheric Observatory (SOHO) reached its 10th anniversary in space last December. It has been observing the Sun every day for the last 11 years since it was launched in December 1995. In spite of some major setbacks, it has brought back interesting information about the Sun and its activity during its maximum and minimum solar cycles.

Ulysses

http://ulysses.jpl.nasa.gov/

By the time you read this, Ulysses would have entered the south polar region of the Sun to study its activity for the next several months. Ulysses had already made two passes of each of the polar regions of the Sun since its launch in October 1990 and performed extensive study of the Sun's dynamic activity during its maximum and minimum solar cycles.

MESSENGER

http://messenger.jhuapl.edu/

MErcury Surface, Space ENvironment, GEochemistry and Ranging (MESSENGER) made its first flyby of Venus last October. The next Venus flyby will occur in June 2007, and the subsequent flybys will be at Mercury. The purpose of the flybys is for the spacecraft to receive the gravitational pull that it needs to get into Mercury orbit as accurately as possible in March of 2011.

Mars Exploration Rovers

http://marsrovers.jpl.nasa.gov/home/index.html

Two rovers, working on opposite sides of Mars, successfully completed their primary missions in April 2004. Both rovers are now in their extended missions. One of the rovers, Opportunity, discovered evidence in rocks' composition and textures indicating that a body of salty water had once flowed gently across where it had landed. Both rovers have already traveled several miles since the beginning of their missions and are in very good health.

Mars Global Surveyor

http://mars.jpl.nasa.gov/mgs/

As of this writing, engineers are striving to restore full communications with Mars Global Surveyor

A New Paradigm for Lunar Orbits

By Trudy E. Bell

It's 2015. You're NASA's chief engineer designing a moonbase for Shackleton Crater at the Moon's south pole. You're also designing a com-system that will allow astronauts constant radio contact with Earth.

But you know that direct transmissions won't work--not always. As seen from Shackleton Crater, Earth is below the horizon for two to three weeks each month (depending on the base's location). This blocks all radio signals, which travel line of sight.

The solution seems obvious. Simply place a satellite in a high, circular orbit going almost over the Moon's poles. Better yet, place three satellites into the same orbit 120 degrees apart. Two would always be above the lunar horizon to relay messages to and from Earth.

There's just one problem.

"High-altitude circular orbits around the Moon are unstable," says Todd A. Ely, senior engineer for guidance, navigation, and control at NASA's Jet Propulsion Laboratory. "Put a satellite into a circular lunar orbit above an altitude of about 750 miles (1200 km) and it'll either crash into the lunar surface or it'll be flung away from the Moon altogether in a hyperbolic orbit." Depending on the specific orbit, this can happen fast: within tens of days.

Why? Earth is responsible. The gravity of massive Earth only 240,000 miles (400,000 km) from the Moon constantly tugs on lunar satellites. For a lunar orbit higher than 750 miles, Earth's pull is actually strong enough to whisk a spacecraft out of the game.

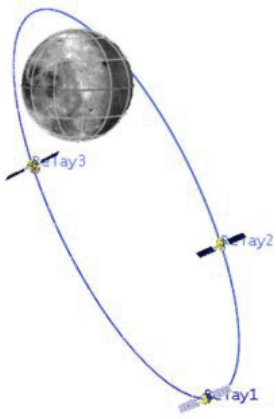
Satellites in Earth orbit don't experience this sort of interference from the Moon. The Moon has just 1/80th Earth's mass—scarcely more than 1%. Relatively speaking, the Moon is a gravitational pipsqueak. Indeed, to any satellite in Earth orbit, the gravitational pull of the Sun is 160 times stronger than any lunar influence.

Any satellite in orbit around the Moon higher than about 750 miles, however, finds itself in a kind of celestial tug-of-war between Moon and Earth. Earth's pull can actually change the shape of an orbit from a circle to an elongated ellipse.

Stable circular lunar orbits do exist below an inclination of 39.6º, says Ely, but they spend so much time near the equator that "they are terrible orbits for covering the poles."

NASA wants to explore the Moon's polar regions for many reasons--not least is that deep polar craters may contain ice, which astronauts could harvest and melt for drinking or split into hydrogen and oxygen for rocket fuel and other uses. The instability of polar orbits poses a real problem for exploration.

Now for the good news. Ely and several colleagues have discovered a whole new class of "frozen" or stable high-altitude lunar orbits. Pictured right, they are all inclined at steep angles to the Moon's equatorial plane so they get far above the horizon at the lunar poles, and--surprise--they are all also quite elliptical.



"For better South Pole coverage, you want an ellipse with an eccentricity of about 0.6, which is pretty oval," Ely says. An eccentricity of 0 is a circle, along which a satellite travels at a constant speed around a primary body (say, the Moon) at its center. With Earth nearby, that's out of the question: "An inclined circular orbit is kind of a blank canvas where Earth can quickly work its will," Ely says.

In contrast, an eccentricity of 0.6 is an ellipse about as oval as an American football minus the pointed ends; the Moon would be at one focus of the ellipse. "The ellipse effectively 'locks in' the satellite's behavior to make it tougher for Earth to change," Ely explains. [See the appendix below for details.] How stable are they? Ely and his colleagues calculate that certain elliptical, high-inclination, high-altitude lunar orbits may remain stable for periods of at least a century. Indeed, Ely hypothesizes the orbits could last indefinitely.

For lunar communications and navigation, Ely recommends spacing three satellites 120º apart in the same elliptical orbit at an inclination of 51º. Each satellite in turn would go screaming down past periapsis (closest approach to the lunar surface) only 450 miles (700 km) above the north lunar pole, but would each linger fully 8 hours of its 12-hour orbit at 5,000 miles (8,000 km) above the horizon over the south lunar pole. In this configuration, two of the three satellites would always be in radio line-of-sight from a South Pole moonbase.

High-inclination, highly elliptical orbits being cheapest and most stable for communications satellites around the Moon? To Earth-centered satellite engineers used to thinking in terms of circular equatorial orbits, "it's a new paradigm," Ely declares.

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February Guest Speaker : Jon Christensen

Jon Christensen purchased his first telescope, a 60mm refractor from Kmart, in 1984 after taking a general astronomy course at A.S.U. where he learned that the universe was far more complex and interesting than he had ever imagined. He joined EVAC in 1996 after purchasing a 10 inch Newtonian scope. Like many astronomy hobbyists, he was interested in astrophotography and learned the basic techniques for film photography from reading The Backyard Astronomer's Guide by Dickinson and Dyer. After experimenting with film and digital cameras for a couple of years, Jon read Ron Wodaski's The New CCD Astronomy and proceeded to pursue CCD imaging. Jon has worked for the last 18 years in property management.

2007 All-Arizona Messier Marathon

by AJ Crayon

It's approaching that time of year… again! Time for the annual All-Arizona Messier Marathon, sponsored by Saguaro Astronomy Club.

This year's big event will again be held at the Farnsworth Ranch site, south of Arizona City. Coordinates are 32° 27' 45" N, 111° 43' 53" W. The elevation is 1,800' above sea level.

The date is Saturday, March 17, 2007.

The Moon will set on Saturday at 17:18. Sunset is at 18:40. Astronomical twilight ends at 19:58 and begins again at 05:11 on Sunday. The sun rises at 06:28 on Sunday.

This year is not one for finding all 110 objects. At best we can look forward to seeing 109. Yet the early setters on Saturday night shouldn't pose a difficult observing problem for, at twilight, the ever challenging M74 will be 14 degrees above the horizon. What will catch your eye however, is magnitude -4 Venus just 5.5 degrees to its southeast. Adding to this view will be 11th magnitude P/Encke(2P) at 5.5 degrees to the west of M74. If you have some time check out these two visitors. Next is the Andromeda triad M31, M32 and M110, at 16 degrees above. Try not to worry about M39 as it is 3 degrees below, but you might try to bag it before twilight. Others in this category are M102, M101, M3 and M53 amongst others. If you find these early on, make a note on the observing list that they were observed this early.

The late risers for Sunday are the same ones as in years gone by. Andromeda is on the horizon when it rises at 4:53am. At twilight M30 is 1.5 degrees below the horizon, due to rise at 5:18am and just 13' to the left, along the horizon, will be 0.3 magnitude Mercury. At this time, 5:18am, we will see M 2 and M103 10 degrees above the horizon. At 12 degrees above there will be M72 and M73 with 1st magnitude Mars straight down from there. Two things here, first the ecliptic is nicely pictured by following Mars down to Mercury. One third of this distance is where you will find Neptune. Check these out - if you have the time! The moon, rising at 6:16am, shouldn't be a factor as at that time there will have been too much light to observe catalog entries in a telescope.

Your observing will not go unnoticed.

There will be awards in recognition of effort. People observing 50 or more objects will receive a printed certificate. For first, second and third place: a small plaque suitable for mounting on a telescope.

Registration in advance is not required. The event is free and open to all, but we will need either you or your club support to purchase the plaques, which in the past have cost under $10. There is no charge for the certificates.

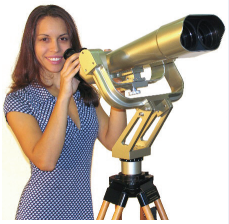
For complete details, please visit:

http://www.saguaroastro.org/content/messier2007.htm

EVAC Classified Ads

Oberwerk BT-80-45

Oberwerk binocular telescope with 45° angle eyepiece holders. These were purchased brand new about one year ago and are in excellent condition. They feature BAK 4 prisms and fully broadband multi-coated optics. They come with 20x eyepieces which give a 3° FOV, but they can be used with any standard 1¼ inch eyepieces; my eyepiece sets gave magnifications from 17x to 70x. Weight is 16 pounds. The $595 price is for the binoculars only - no mount or tripod included.



Full specifications and photos can be found at bigbinoculars.com - sort by brand and choose 'Oberwerk'; then scroll down to 'Oberwerk BT-80-45'.

I wrote a review on these at cloudynights.com - go to 'Forums', 'Binoculars', 'Links to 240 Minireviews' then scroll down to 'Oberwerk BT80 45 degree binocular telescope dated 1/17/2006'.

Silvio Jaconelli

480-926-8529 (home) or 480-262-2322 (cell)

Email: silvioj@msn.com

12" Meade LX-200 GPS

I am selling my 12" LX-200 GPS UHTC in order to fund another project. Everything is in perfect working order. I sent it to Meade for refurbishing in January 2006 and it has all new electronics and metal drive gears. For all practical purposes it's a new scope. Although it's heavy (75 lbs), the Get-a-Grip handles make it an easy lift for two people and a doable lift for one if you are in shape. Performs wonderfully as a visual instrument and it has worked magnificently with a F3.3 focal reducer and a StellaCam-II video camera.

See: http://www.eastvalleyastronomy.org/class-ads.html

Package includes:
12" LX200-GPS UHTC
All Original Equipment
(including Giant Field Tripod, Manual, 26mm eyepiece, original box, etc.)
Upgrades/Extras:
Mounting Plate ($99)
Get-A-Grip handles ($130)
A new 12" LX200R is $4,694, your price is $2,700

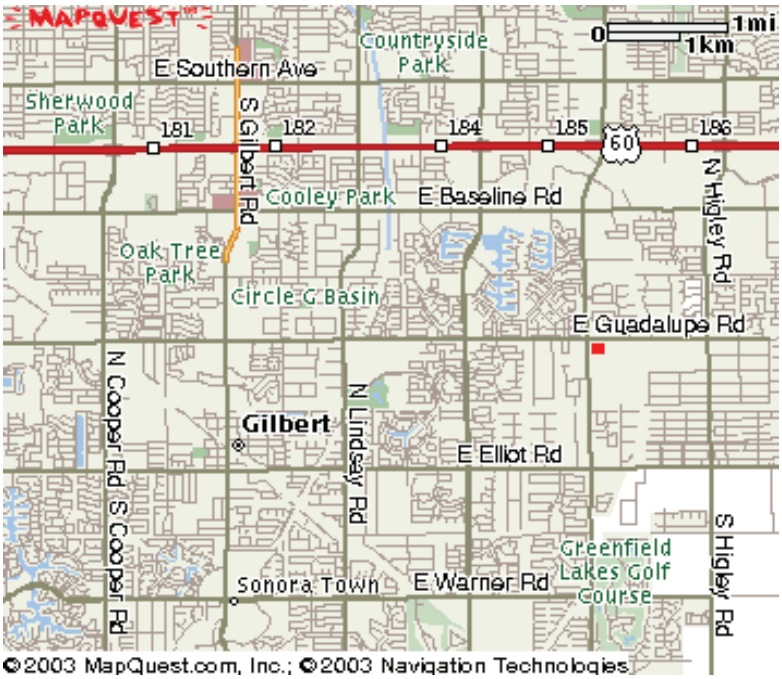
Also for Sale:
APT Astro AMF Equatorial Wedge ($650) – Price $450.
The APT wedge is equivalent to the Mittty Evolution Wedge and will handle up to a 14" Meade RCX400
Astrovid Stellcam II ($795) – Price $500

Marty Pieczonka 480-983-0915
Email: martyp@sybase.com

www.eastvalleyastronomy.org/grco/obs.asp

Advertisements for astronomical equipment or services will be accepted from current EVAC members only. Ads will be published as space permits and may be edited. Ads should consist of a brief text description and must include a current member name and phone number. You may include your email address if you wish. Ads will be published until canceled (as space allows), so please inform the editor when your item has sold.

Ads should be emailed to: news@eastvalleyastronomy.org



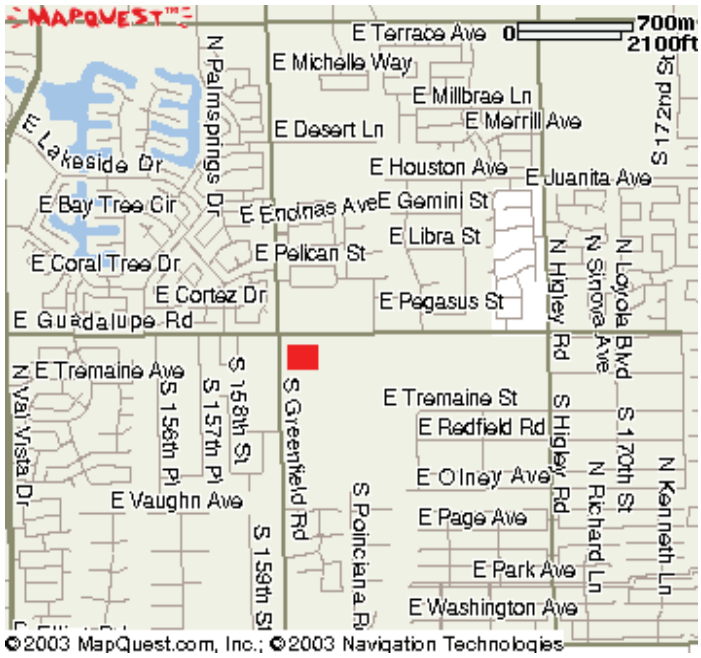
The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

Our meetings are held on the third Friday of each month, at the Southeast Regional Library in Gilbert. The library is located at 775 N. Greenfield Rd., on the southeast corner of Greenfield and Guadalupe Roads. Meetings begin at 7:30pm.

Visitors are always welcome!

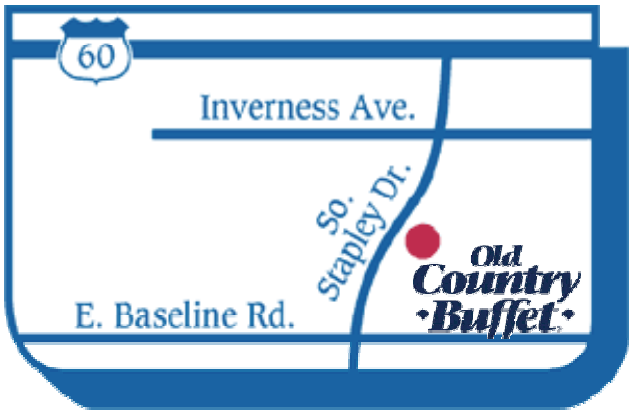
2007 Meeting Dates

February 16
March 16
April 20
May 18
June 15
July 20
August 17
September 21
October 19
November 16
December 21



Southeast Regional Library
775 N. Greenfield Road
Gilbert, AZ 85234

All are welcome to attend the pre-meeting dinner at 5:30 PM. We meet at **Old Country Buffet**, located at 1855 S. Stapley Drive in Mesa. The restaurant is in the plaza on the northeast corner of Stapley and Baseline Roads, (near the Walmart Supercenter) just south of US 60.



Old Country Buffet 1855 S. Stapley Drive in Mesa

Likewise, all are invited to join us after the meeting for coffee and more astro talk at the Village Inn Restaurant located on the northeast corner of Southern and Gilbert in Mesa.

Village Inn 2034 E. Southern Ave in Mesa

February 2007

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

Schedule of Events

- *February 8 - Sanborn Elementary School Outreach Event*
- *February 9 - Public Star Party at Riparian Preserve in Gilbert*
- *February 10 - Local Star Party at Boyce Thompson Arboretum*
- *February 13 - Ryan Elementary School Outreach Event*
- *February 16 - Meeting at Southeast Regional Library in Gilbert*
- *February 17 - Deep Sky Star Party at Vekol Road*
- *February 22 - Las Sendas Outreach Event*
- *February 22 - Coronado Elementary School Outreach Event*

January's Meeting Minutes

Meeting Minutes of EVAC General Assembly, January 19, 2007

The meeting was called to order by President Claude Haynes shortly after 7:30 p.m. Friday January 19, 2007. The listed agenda included:

Introduction of the Board by Claude Haynes

Welcome to New Members

Treasurer's report by outgoing treasurer Wayne Thomas

Acknowledgement of published astrophotography - Jon Christensen and Chris Schur

Vote of approval for new Observatory Manager

Report on the Gilbert Rotary Centennial Observatory by Martin Thompson

Board vacancy to fill

Awards by Peter Argenziano

Announcements

Events by Randy Peterson

Q&A by Howard Israel

After a short break, VP Howard Israel introduced the speaker for the evening, Dr. Ted Bowell from Lowell Observatory in Flagstaff. Dr Bowell spoke on his experiences and challenges of the IAU decision to reclassify Pluto to a "dwarf planet". He gave an insiders view of the proceedings including an historical perspective of how planets come and go. He left us with his current challenge of leading a team to come up with a better definition of a planet than currently exists.

East Valley Astronomy Club -- 2007 Membership Form

Please complete this form and return it to the club Treasurer at the next meeting or mail it to EVAC, PO Box 2202, Mesa, Az, 85214-2202. Please include a check or money order made payable to EVAC for the appropriate amount.

IMPORTANT: All memberships expire on December 31 of each year.

Select one of the following:

☐ New Member ☐ Renewal ☐ Change of Address

New Member Dues (dues are prorated, select according to the month you are joining the club):

☐ **$30.00 Individual** January through March

☐ **$35.00 Family** January through March

☐ **$22.50 Individual** April through June

☐ **$26.25 Family** April through June

☐ **$15.00 Individual** July through September

☐ **$17.50 Family** July through September

☐ **$37.50 Individual** October through December

☐ **$43.75 Family** October through December

Includes dues for the following year

Renewal (current members only):

☐ **$30.00 Individual** ☐ **$35.00 Family**

Magazine Subscriptions (include renewal notices):

☐ **$34.00** Astronomy ☐ **$33.00** Sky & Telescope

Name Badges:

☐ **$10.00** Each (including postage) Quantity: _____

Name to imprint: _____

Total amount enclosed: ☐

Please make check or money order payable to EVAC

☐ Payment was remitted separately using PayPal ☐ Payment was remitted separately using my financial institution's online bill payment feature

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Name: ☐

Phone: ☐

Address: ☐

Email: ☐

☐ Publish email address on website

City, State, Zip: ☐

URL: ☐

How would you like to receive your monthly newsletter? (choose one option):

☐ Electronic delivery (PDF) *Included with membership* ☐ US Mail **Please add $10 to the total payment**

Areas of Interest (check all that apply):

☐ General Observing ☐ Cosmology

☐ Lunar Observing ☐ Telescope Making

☐ Planetary Observing ☐ Astrophotography

☐ Deep Sky Observing ☐ Other

Please describe your astronomy equipment:

Would you be interested in attending a beginner's workshop? ☐ Yes ☐ No

How did you discover East Valley Astronomy Club? ☐

PO Box 2202
Mesa, AZ 85214-2202
www.eastvalleyastronomy.org

All members are required to have a liability release form (waiver) on file. Please complete one and forward to the Treasurer with your membership application or renewal.

Liability Release Form

In consideration of attending any publicized Star Party hosted by the East Valley Astronomy Club (hereinafter referred to as "EVAC") I hereby affirm that my family and I agree to hold EVAC harmless from any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), which may directly or indirectly be connected to EVAC and/or my presence on the premises of any EVAC Star Party and related areas.

I further agree to indemnify any party indicated above should such party suffer any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), caused directly or indirectly by my negligent or intentional acts, or failure to act, or if such acts or failures to act are directly or indirectly caused by any person in my family or associates while participating in an EVAC Star Party.

My signature upon this form also indicates agreement and acceptance on behalf of all minor children (under 18 years of age) under my care in attendance.

EVAC only recognizes those who are members or invitees and who also have a signed Liability Release Form on file as participants at an EVAC Star Party.

_____ _____

Please print name here *Date*

_____

Please sign name here

PO Box 2202
Mesa, AZ 85214-2202
www.eastvalleyastronomy.org

A Great Big Wreck
by Dr. Tony Phillips

People worry about asteroids. Being hit by a space rock can really ruin your day. But that's nothing. How would you like to be hit by a whole galaxy?

It could happen. Astronomers have long known that the Andromeda Galaxy is on a collision course with the Milky Way. In about 3 billion years, the two great star systems will crash together. Earth will be in the middle of the biggest wreck in our part of the Universe.

Astronomer John Hibbard isn't worried. "Galaxy collisions aren't so bad," he says. A typical spiral galaxy contains a hundred billion stars, yet when two such behemoths run into each other "very few stars collide. The stars are like pinpricks with lots of space between them. The chance of a direct hit, star vs. star, is very low."

Hibbard knows because he studies colliding galaxies, particularly a nearby pair called the Antennae. "The two galaxies of the Antennae system are about the same size and type as Andromeda and the Milky Way." He believes that the Antennae are giving us a preview of what's going to happen to our own galaxy.

The Antennae get their name from two vast streamers of stars that resemble the feelers on top of an insect's head. These streamers, called "tidal tails," are created by gravitational forces—one galaxy pulling stars from the other. The tails appear to be scenes of incredible violence.

But looks can be deceiving: "Actually, the tails are quiet places," says Hibbard. "They're the peaceful suburbs of the Antennae." He came to this conclusion using data from GALEX, an ultraviolet space telescope launched by NASA in 2003.

The true violence of colliding galaxies is star formation. While individual stars rarely collide, vast interstellar clouds of gas do smash together. These clouds collapse. Gravity pulls the infalling gas into denser knots until, finally, new stars are born. Young stars are difficult to be around. They emit intensely unpleasant radiation and tend to "go supernova."

GALEX can pinpoint hot young stars by the UV radiation they emit and, in combination with other data, measure the rate of star birth.

"Surprisingly," Hibbard says, "star formation rates are low in the tidal tails, several times lower than what we experience here in the Milky Way." The merging cores of the Antennae, on the other hand, are sizzling with new stars, ready to explode.

So what should you do when your galaxy collides? A tip from GALEX: head for the tails.

To see more GALEX images, visit www.galex.caltech.edu. Kids can read about galaxies and how a telescope can be a time machine at spaceplace.nasa.gov/en/educators/galex_puzzles.pdf

This GALEX UV image of the colliding Antennae Galaxies shows areas of active star formation, which is not in the tidal tails as one might expect.

If it's Clear...

by Fulton Wright, Jr.
Prescott Astronomy Club

February 2007

Shamelessly stolen information from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find info. When gauging distances, remember that the Moon is 1/2 a degree or 30 arc minutes in diameter. All times are Mountain Standard Time unless otherwise noted.

On Thursday, February 1, at 5:39 PM (20 minutes before sunset) the full moon rises, so forget the faint fuzzies tonight. Tomorrow when the Moon rises (6:41 PM) it will be 2 degrees from Saturn.

On Wednesday, February 7, in the early evening, you will be presented with a difficult observing challenge. (Was last month's challenge of Venus and Neptune too much? This should not be quite as tough.) The brightest planet (Venus, mag -4) and the second dimmest (Uranus, mag 6) will be only 0.7 degrees apart but very low in the west southwest. Uranus is to the right and very slightly lower. Here are some times for planning your attack.

6:05 PM Sun sets

6:31 PM Civil twilight ends (several stars out)

7:01 PM Nautical twilight ends (bright constellations visible)

7:30 PM Astronomical twilight ends (really dark)

8:00 PM Uranus sets

8:01 PM Venus sets

On Wednesday, February 7, around 7:00 PM (while you are facing the challenge given above) you can see Mercury at its best. Look 7 degrees down and to the right from Venus for the mag 0 planet. A small (3 inch) telescope might show a phase similar to a half moon. Mercury should be visible for a week around this date.

On Saturday, February 10, Saturn is at opposition, which means that it rises at sunset (about 6:00 PM) and stays visible all night. Tonight would be a good night to check out Saturn's moons. Astronomy magazine, February 2007, p. 55 has a nice diagram for identifying them on this night. Saturn will be well placed for observing for the next few months.

On Saturday, February 17, it is new moon so you can look for faint fuzzies all night.

On Saturday, February 17, at 11:12 PM, you might be able to see a 12th magnitude asteroid (Pandora) occult a 10th magnitude star. See Sky & Telescope magazine, Feb 2007, p.64 for details.

On Monday, February 19, about 10:40 PM, you can see Algol at its minimum. This eclipsing binary variable star is usually at magnitude 2.1 (about the same as gamma Andromedae in the constellation next door, check it out the night before or after), but tonight is will be magnitude 3.4 (about the same as Rho Persius, 2 degrees south). It will be near minimum value for around an hour then slowly brighten.

From Thursday, February 22 through Monday, February 26, you can see the southern pole of the Moon at its best. Libration tips that part of the Moon toward us.

Swirls of gas and dust reside in this ethereal-looking region of star formation imaged by NASA's Hubble Space Telescope. This majestic view, located in the Large Magellanic Cloud (LMC), reveals a region where low-mass, infant stars and their much more massive stellar neighbors reside. A shroud of blue haze gently lingers amid the stars.

Known as LH 95, this is just one of the hundreds of star-forming systems, called associations, located in the LMC some 160,000 light-years distant. Earlier ground-based observations of such systems had only allowed astronomers to study the bright blue giant stars present in these regions. With Hubble's resolution, the low-mass stars can now be analyzed, which will allow for a more accurate calculation of their ages and masses.

This detailed view of the star-forming association LH 95 was taken with Hubble's Advanced Camera for Surveys and provides an extraordinarily rich sample of newly formed low-mass stars. The LMC is a galaxy with relatively small amounts of elements heavier than hydrogen, giving astronomers an insight into star formation in environments different than our Milky Way.

Image courtesy of NASA, ESA, and the Hubble Heritage Team (STScI/AURA)

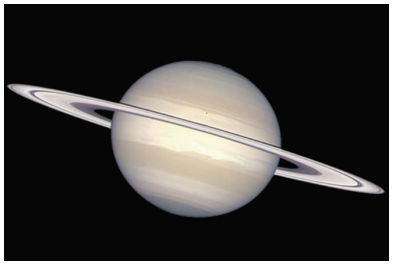
Milestones in Robotic Solar System Exploration

(MGS) on the 10th anniversary of the spacecraft's 7 November 1996 launch. Engineers were sending routine commands to MGS to have it adjust its solar panels when the spacecraft went into a safe mode due to computer glitches onboard MGS. During its primary mission, MGS took interesting images of Mars and mapped its surface composition and texture. MGS is currently handling relay communications between Earth and spacecraft that are currently at Mars and scouting for feasible locations for future Mars missions.

Cassini

http://saturn.jpl.nasa.gov/

What can I say about Cassini? This spacecraft truly has come a long way since its launch back in October 1997! Cassini released the Huygens probe which landed successfully at Titan and made numerous flybys of the engmatic world to perform in-depth study of its surface and atmosphere. Cassini reached the halfway mark in its 4-year mission this year and will have more Titan flybys to perform until the primary mission ends. Meanwhile, Cassini has been studying Saturn's multiple moons, extensive ring system, and magnetosphere and has brought back awesome images, as well as informational data, of the Saturnian system. Extended mission is in the works for Cassini.



NEW HORIZONS
NASA's Pluto-Kuiper Belt Mission

New Horizons

http://pluto.jhuapl.edu/index.php

Blazing along its path to Pluto, its companion moon, Charon, and the Kuiper Belt, New Horizons has come within hailing distance of Jupiter. The first image taken of the giant planet by the spacecraft's Long Range Reconnaissance Imager (LORRI) is a tantalizing promise of what's to come when New Horizons flies through the Jovian system in February 2007. (The photo of Jupiter can be seen in the New Horizons website.) The spacecraft has already reached the asteroid belt, a large swath containing numerous small solar system bodies between Mars and Jupiter.

Voyager
The Interstellar Mission

Voyagers 1 & 2

http://voyager.jpl.nasa.gov/

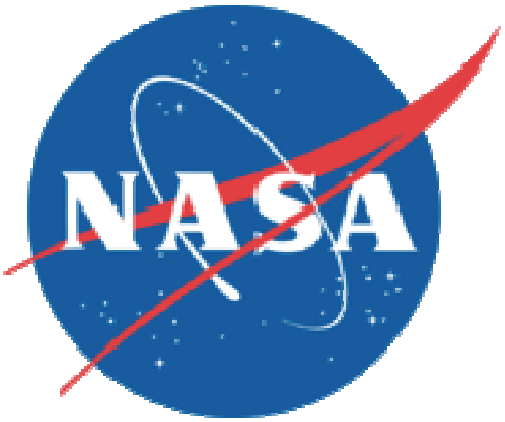
Voyager 1, already the most distant human-made object in the cosmos, reached 100 astronomical units from the Sun last August 15th at 2:13 PM, Mountain time. That meant that the spacecraft, which launched nearly three decades ago, would be 100 times more distant from the Sun than Earth is. The Voyagers owe their longevity to their nuclear power sources, called Radioisotope Thermoelectric Generators (RTGs) supplied by the U.S. Department of Energy. Both spacecraft flew past the outer solar system planets (Jupiter, Saturn, Uranus, and Neptune) and brought back awesome images and extremely interesting data on the outer solar system.

Jet Propulsion Laboratory (JPL)

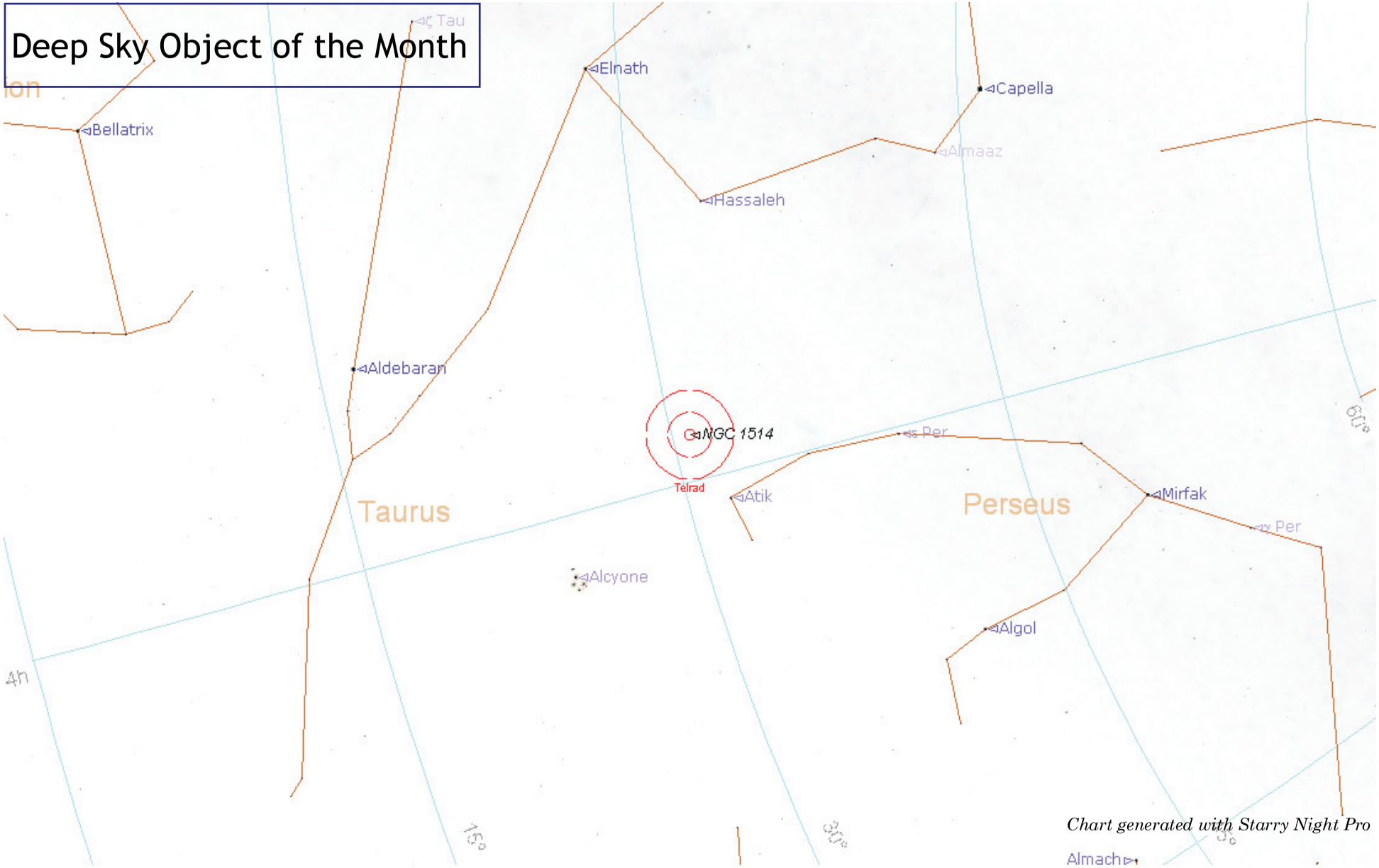
http://www.jpl.nasa.gov/

This article would not be complete without my mentioning that Jet Propulsion Laboratory is currently celebrating its 70th anniversary in robotic solar system exploration. A group of guys performed rocket testing back in 1936, and from there on, numerous missions have been conducted to explore our celestial neighborhood, as well as the Sun, our home planet and its companion, La Luna.

My e-mail address is launchspace@msn.com, and my fax number is 480.890.7878. The website for the JPL Solar System Ambassadors Program is http://www.jpl.nasa.gov/ambassador.



Deep Sky Object of the Month



NGC 1514 (aka the Crystal Ball) Planetary Nebula in Taurus

RA 04h 09m 16.9s Dec +30° 46' 34" Magnitude: 10.0 Size: 1.9'

Magnitude of Central Star: 9.4 Distance: 2,300 ly

Metric Moon *by Patrick L. Barry*

If you think in pounds and miles instead of kilograms and kilometers, you're in the minority. Only the United States, Liberia, and Burma still primarily use English units -- the rest of the world is metric. And now the Moon will be metric too.

NASA has decided to use metric units for all operations on the lunar surface when it returns to the Moon. The Vision for Space Exploration calls for returning astronauts to the Moon by 2020 and eventually setting up a manned lunar outpost.

The decision is a victory not only for the metric system itself, which by this decision increases its land area in the solar system by 27%, but also for the spirit of international cooperation in exploring the Moon. The decision arose from a series of meetings that brought together representatives from NASA and 13 other space agencies to discuss ways to cooperate and coordinate their lunar exploration programs. Standardizing on the metric system was an obvious step in the right direction.

"When we made the announcement at the meeting, the reps for the other space agencies all gave a little cheer," says Jeff Volosin, strategy development lead for NASA's Exploration Systems Mission Directorate. "I think NASA has been seen as maybe a bit stubborn by other space agencies in the past, so this was important as a gesture of our willingness to be cooperative when it comes to the Moon."

The meetings, which began in April 2006, included representatives from the Australian, Canadian, Chinese, European, French, German, British, Indian, Italian, Japanese, Russian, South Korean and Ukrainian space agencies, all of which are either planning or considering some form of lunar exploration. "Of course there's some competitiveness and national pride involved," Volosin says, "but we want to find areas where our goals overlap and see if cooperating in certain areas would be best for everyone."

Going metric was one of those areas. Agreeing to use a single measurement system will make the human habitats and vehicles placed on the Moon by different space agencies more compatible with each other. That could come in handy if, say, one agency's moonbase needs emergency spare parts from another agency's base. No need to worry about trying to fit a 15 millimeter nut onto a 5/8 inch bolt.

Emergencies aside, a metric standard will make it easier for countries to form new partnerships and collaborations after their lunar operations are already in place. All data will be in compatible units, whether it's scientific data or operational data -- such as how far a rover must travel to reach the edge of a crater. A single measurement system will make sharing this data and merging operations more seamless.

Although NASA has ostensibly used the metric system since about 1990, English units linger on in much of the U.S. aerospace industry. In practice, this has meant that many missions continue to use English units, and some missions end up using both English and metric units. The confusion that can arise from using mixed units was highlighted by the loss of the Mars Climate Orbiter robotic probe in 1999, which occurred because a contractor provided thruster firing data in English units while NASA was using metric.

NASA is considering adopting other standards for its lunar operations as well. For example, another idea that has been discussed informally by the space agencies is using the same type of internet protocols that we all use here on Earth today for communications systems developed for the Moon. "That way, if some smaller space agency or some private company wants to get involved in something we're doing on the Moon, they can say, hey, we already know how to do internet communications," Volosin says. "It lowers the barrier to entry."

In all, this push toward standards and cooperation gives the return to the Moon a very different feel than the Cold War space race of the 1950s and '60s. This time around, competition may help motivate nations to reach for the Moon, but cooperation will help to get them there.

Article reprinted courtesy of Science@NASA

Coming in March… our guest speaker will be EVAC member Gene Lucas.

● Full Moon on February 2 at 22:46

◑ Last Quarter Moon on February 10 at 02:52

○ New Moon on February 17 at 09:15

◐ First Quarter Moon on February 24 at 00:56

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Please send your contributions, tips, suggestions and comments to the Editor (Peter Argenziano) at: news@eastvalleyastronomy.org

Contributions may be edited.

www.eastvalleyastronomy.org

Keep Looking Up!

East Valley Astronomy Club

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