October 2005

The Voyager

East Valley Astronomy Club

Volume 19 Issue 10

From the Desk of the President

by Steven Aggas, 2005 EVAC President

It's elections time of year! Have you considered running for an office? At the last meeting we were able to fill in many blanks in the EVAC Cabinet, but there are a few worth mentioning here! Are you interested in helping coordinate the EVAC events? If so, Randy Peterson would like to share the Events Coordinator's position. Secondly, we are still in need of a Secretary which entails documenting the minutes of the meetings and house the important documents of EVAC. The third opening is that of Vice President. EVAC's VP not only shakes down the local universities and observatories for professors who look to grab the spotlight, but scouts the surrounding astronomy clubs, including ours, for amateurs who are experts in their fields, (like Jon Christensen and his amazing CCD images we enjoyed at the September meeting). And lastly, EVAC would be in need of a President. (I don't want to hog all the fun). I figured I would let someone else be President if they wanted to. If no one steps forward I may throw my hat in the ring for the price of a beer (send me an email). Let us know if you are interested!

As our speaker for the October General Assembly meeting, we will have Dr. Bill Hartmann. Dr. Hartmann has a PhD in astronomy from UA, is the lead author of the current theory about the origin of the moon, and the first winner of Carl Sagan Medal from American Astronomical Society for popular writing and artwork about astronomy. He is also the recipient of a medal from European Geophysical Society for work on Mars. An asteroid is also named after him for his work on planet origins and evolution.

Join us at the Southeast Regional Library (Gilbert Public Library) on Friday, October 21st at 7:30PM. The GPL is located at the Southeast corner of Greenfield and Guadalupe Roads.

The Backyard Astronomer

Telescope Parameters (Part One) *by Bill Dellinges*

First let me say there will be no test covering this material!

Focal Ratio: Other than deciding on whether you want a reflector or refractor, choosing the scope's *focal ratio* **(F-R)** is possibly the most important factor to ponder when selecting a telescope (then portability and cost). I suspect many budding amateurs ignore focal ratio when shopping for their new scope and instead concentrate on the look of the instrument or how many bells and whistles it has. F-R is very simply the ratio of the telescope's aperture to its focal length **(F.L.).** For instance, the popular 8" Schmidt-Cassegrain telescope **(SCT)** has a focal length of about 80". Dividing 80" by 8" gives us 10. Thus we say the telescope has a F-R of F10. Incidentally, F.L. is usually stated in millimeters **(mm)** while aperture will usually be in inches. So you will likely have to convert your aperture from inches to millimeters to do the above division. The conversion factor is: 25.4mm = 1". Thus, 2032mm/203.2 = 10 = F10.

So what? What does F-R tell you? Well, the range of F-R runs from about F4 to F15 in most amateur telescopes. Generally speaking, F-R's of less than 8 are considered to be wide field scopes and are found in most Newtonian reflectors. So these telescopes are especially suited to deep sky viewing where a wide field is desired. F-R's over 8

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Inside this issue:

October Events:

- *All-Arizona Star Party at Farnsworth Ranch - September 30 - October 1*
- *Public Star Party in Gilbert - October 14*
- *Monthly Meeting at Southeast Regional Library - October 21*
- *Local Star Party at Boyce Thompson - October 22*

The Backyard Astronomer

(Continued from page 1)

were historically found in long focus refractors to provide high resolution views of stars, planets, and the Moon. This came at the expense of a narrower field. The longer focal length of refractors was necessary to control color aberrations in their objective lenses.

So if you were a deep sky person, you'd want, say, an F5 telescope. If you were primarily a planetary observer, you might be shopping for an F15 refractor. It used to be that simple.

While the above is still VERY generally true, modern advances in optics require a slight adjustment to the above F-R concept. New types of glass have made it possible to lower the F-R of refractors down to F5 (!). New lens accessories called focal reducers enable F10 Schmidt-Cassegrains to perform at F6.3. This trend reflects the desire and popularity among modern observers for wider fields of view in their telescopes. Need high power? 1) Buy a higher F-R telescope in the first place 2) In your low F-R scope, use a Barlow lens with either a 2x, 3x, or 5x multiplication factor 3) Use one of the many new quality short focal length eyepieces **(ep)** on the market. Oh yes, the amateur astronomer indeed lives in a good time (lots of toys to choose from).

One last point about F-R; in photography, F15 is considered "slow" and F5 "fast" insofar as how efficient they are in gathering light. This does not apply in visual use. An F15 and F5 scope at the same power will show the same image brightness. It is NOT true the "faster" F5 scope's image will be brighter visually. However, it will have the advantage over the f15 instrument in requiring less time exposure *photographically*.

Magnification: Easy as pie! [F.L. of scope/F.L. of ep = power]. Divide the focal length of your telescope by the focal length of your ep. The latter is always stamped on the eyepiece. The former can sometimes be found on a data plate on the telescope tube; if not there, check your scope's manual. Again, this computation will be done in millimeters. Example: (Our 8" SCT) 2032mm/ 20mm ep = 101.6x. We can rearrange this formula to help us choose future ep's: [F.L. of scope/power = F.L. of ep.]. Example: What F.L. ep do I need to give me 150x? 2032/150x = 13.5mm (or thereabouts).

Real Field: There are three ways to determine your "real field" (RF), which is how big a chunk of sky you are seeing when you peer into your eyepiece, or more precisely, the width of that field in either degrees or minutes of arc. For instance, let's say the full moon just fits in your 50x field. Since the moon's width is about 30' arc minutes (about half a degree), you are seeing a field of 30' or half a degree. This is not to be confused with an ep's "apparent field" (AF) which describes how big of an angle you can see inside the ep. Hold the ep up to the light. Look into it. Observe the field stop (the black circle inside limiting your view). The angle your eye makes with each field side is its apparent field. Most older ep's had an AF of 40 degrees, a pretty narrow view. Modern Plossl's have about 50-52 degrees AF. Newer wide angle ep's go up to 82 degrees AF. Today, anything less than an AF of 60 degrees is considered barbaric. Let's use this term AF for the easiest (but least accurate) way to determine our RF. [RF = AF of ep/power]. Example: consider a Radian ep of 18mm F.L. and 60 degree AF in an 8" SCT: 1) calculate the power, 2032/18 = 113x. 2) 60/113x = 0.53 degrees of RF.

This method, though approximate, will work for most people most of the time. A casual observer need not be concerned with the next two more refined methods of determining RF. A second approach to find RF is to use a formula often seen in TeleVue catalogs: ep field stop/ focal length x 57.3 = RF

Here you need to find your ep's field stop, almost never, with the exception of TeleVue, stated anywhere. If it isn't, you'll have to measure it yourself by using a ruler to measure the black field stop ring you see near the bottom of the ep just in front of the field lens (In optical parlance, the ep lens nearest the eye is the *eye lens*, the bigger one at the bottom is the *field lens*). As an example, let's assume we are using a TeleVue 20mm Plossl ep with a field stop of 17.1mm in our trusty 2032mm F.L. 8" F10 SCT:

17.1mm/2032mm x 57.3 = 0.482 degrees of RF.

A third approach to RF is the timing method. Aim your scope at a star on or very near the celestial equator (I hope you can fine the celestial equator!). With the scope's motor off, time the passage of the star across the middle of the field, one end to the other end. Multiply the time it took the star to travel across the field in minutes of time by 15. This result will be your RF in minutes of arc. Example:

It took the star 2 minutes to cross the field. 2 minutes times 15 = 30' arc minutes. Your RF is 30' or ½ degree. Of course the timing is not likely to be in even minutes, more like 2 minutes 10 seconds, 1 minute 53 seconds, etc. In that case you'll have to convert those seconds of time into a decimal form of minutes of arc like…2m 10s = 2.16 (to convert, simply divide the 10s by 60; 10/60 = 0.16).

These are just a few basic optical aspects of your telescope you should know. Many club members no doubt already know these principles but perhaps some new to the hobby might find this information helpful. But don't let this material spoil your fun. Get out there and LOOK through your telescope!

Serious Astronomy!
by Paul V. Temple

Ever since I can remember I have loved astronomy. Some of my earliest remembrances are of the warm breeze at dusk just as the first stars come out. Somewhere around the age of 7, I received my first telescope. In the ways of youth I kept hammering on my parents until they broke down and bought me the scope just to shut me up! A Tasco 10-50 power, table top mounted, 50-mm refractor. It was a beauty! I had no idea what I was looking at most of the time, but I sure felt like I was doing important work. Soon to follow was a Sear 3" reflector.

It was during this time that I saw an article about the AAVSO in an astronomy book somewhere. The writer claimed that even small telescopes (my 3" broke and by now I had gotten a 60-mm Sears refractor) could make scientific observations of variable stars. So with trembling pen I wrote to the AAVSO and waited for a reply. Like Leslie Peltier in his book Starlight Nights, I raced to the mailbox each day hoping that my beginner charts had come. When they arrived I was at the height of scientific ecstasy! Now I would join the race for knowledge, follow in the footsteps of Galileo and stand on the shoulders of Giants! A week later I had still not found one variable. In fact, I couldn't even read the charts. Where is this SS Cygni? All I see is a circle, where is the star marked SS Cygni? After two weeks of effort I gave up in despair.

During graduate school I lived in the San Francisco area. Since our school was on the bay the seeing was usually not too good. Plus Theological Graduate school is extraordinarily hard! There wasn't much time or money to pursue my hobby. Even after graduation this was a condition that dogged my astronomical dreams for a long time. At least until 1992. That year I got a deal and built an 8" Dobsonian for $80, optics and all! Now I wanted to do some real work with my "Bargain Bucket."

In the fall of 1992 I saw an ad in Sky & Telescope, wanting ground-based observers for a Hubble Space Telescope project. Mr. Harold Schenk, an amateur observer, was looking for haloes around asteroids. Other amateurs were asked to join the ground-based effort to observe the asteroids at the same time the HST did. Here was my big chance to make a real contribution. The first observation period was rained out. I decided for the second period that I would use the Astronomical Society of Kansas City's 30" telescope. I found out that the secondary mirror had fallen down and broken the main mirror! It was out of commission. Undaunted, I wrote to Dr. Robert Millis at Lowell Observatory requesting time on one of the telescopes there. Permission was obtained to use the 31". A month before the scheduled run, the astronomer assigned to help me left the observatory and everyone else was too busy. Now what to do? I finally contacted Lake Afton Observatory in Wichita, KS. Sure, they would be glad to give me time. The day of the run was a beautiful sunny day. As evening approached clouds began to appear. By evening it was raining! I sat in my motel room and listened to the rain come down while I watched TV. So much for my contribution to science.

Several years later I found myself flat on my back, bitten by the flu and eventually contracting whooping cough. I had already been sick for one month and now I was headed into my second month of convalescence. I decided I really wanted to do something in science that would be more than make-work when I got better.

With trembling fingers (literally trembling from a high fever and cough!) I wrote to the AAVSO once again. I waited and waited and waited. Finally, a reply came. Janet Mattei apologized profusely for the delay but indicated she had to track down my address since I had neglected to write it in the letter anywhere. It must have been my illness, since I am sure that I would never normally forget something so basic as an address. A beginner's chart came several days later. With child-like eagerness I rushed outside on the first clear night I could stagger out of bed without coughing uncontrollably and began to search. After only one half-hour I found Z Ursae Majoris. This was Nirvana! After all these years, I finally made a real contribution to science!

Paul V. Temple
Science Teacher
Chinle High School
Chinle, AZ

The AAVSO was founded in 1911 at Harvard College Observatory to coordinate variable star observations made largely by amateur astronomers. In 1954, the AAVSO became an independent, private research organization. Today with members in more than 40 countries, over 10 million observations to date, and headquarters in Cambridge, Massachusetts, it is the world's largest association of variable star observers in existence.

Membership in the AAVSO is open to anyone interested in variable stars and in contributing to the support of valuable research. Since professional astronomers have neither the time nor the telescopes needed to gather data on the brightness changes of thousands of variables, amateurs have been making a real and useful contribution to science by observing variable stars and submitting their observations to the AAVSO International Database.

http://www.aavso.org/

The Stars in Orion
by Henry De Jonge

Orion is a very noticeable and notable constellation worldwide. According to Burnham, it is "visible from every inhabited part of the earth", and is the " most brilliant of the constellations", [2]. Many cultures have over the ages, given meaning to its form and various stars.

Often what we see from the earth and call a star can often in actuality be something quite different. Over half of the stars in our galaxy are in reality, multiple star systems. In regards to distinguishing stars exclusively, two concepts, brightness and color are necessary. The stars of Orion are full of variations with respect to brightness and color.

In Orion we also see a large number of double and multiple stars, variable stars, star clusters, nebulae, and even other galaxies! Clouds of dust and gas surround many of the stars in Orion, which also effects their brightness and color. You can see that with all this visible variety, it is no surprise that what most people call the "stars" of Orion look quite different from each other.

According to the Bright Star Catalog, [1], there are well over 80 stars that can be called the stars of Orion. If one looks up Orion in Burnham's Celestial Handbook, [2], you will find well over 200 objects that comprise the constellation Orion. Thus there are a considerable number of stars in Orion, not to mention many other objects, all with their own brightness, color, and form.

In discussing how stars differ in appearance we must look at two very basic yet important concepts, brightness and color. How bright a star looks to us from earth is called the apparent magnitude. Hipparchus developed this visual scale in about 130 BC. He ranked visible stars according to how bright they appeared to him on a scale of one to six, with "first magnitude" stars being the brightest and "sixth magnitude" stars being the faintest he could see. Thus the higher the number, the fainter the star. As time went on astronomers wished to extend this brightness scale to encompass more objects. When they looked at this older system they discovered that Hipparchus' "1st magnitude" stars were about 100 times brighter than his "6th magnitude" stars. Astronomers define a difference of 5 magnitudes as a factor of 100 in brightness. Therefore each unit in magnitude corresponds to about a factor of 2.5 in brightness. This is how the stars look with the eye from the earth, and does not account for their variation in distance from the earth. If we were to place the stars at a fixed distance from the earth and then look again at their brightness, (magnitude) we would have a common scale to compare them. Astronomers call this comparison absolute magnitude. The common scaling distance used is 10 parsecs, (about 32 light years away). The human eye can see roughly up to 6 or 6.5 magnitude. For example the full moon is actually about –12 visual magnitude.

In looking at the tables of the stars of Orion in the Bright Star Catalog and in Burnham's Celestial Handbook (> 87 stars), we see that the range of visual magnitudes goes from a low of 0.12, (very bright) to a high of about 7.9, (not visible for a normal human). It appears that a great many of the stars are in the under 6 category, with a range of 3-5. We also see that quite a few of the stars have a variable magnitude, that is, their brightness can vary over time. This can occur for many reasons, and it obviously can make a star much more noticeable.

In the upper arm region we have the bright red giant Betelgeuse with a visual magnitude of 0.7. Rigel, on the leg, is a very bright blue star, (7th brightest in the sky and the brightest in Orion) with a visual magnitude of 0.14. The famous stars in the belt are also varied in brightness. They are Alnitak, (lower left, visual mag.=1.79), Alnilam, (middle, visual mag.=1.70), and Mintaka, (upper right, visual mag.=2.20).

The apparent color of a star (directly related to its surface temperature) is determined by whether the intensity curve, (plotting intensity Vs wavelength) has larger values at the short wavelength or long wavelength end of the visible spectrum, [3]. By measuring the intensity of a stars light through color filters, (U, B, V photometry) we can calculate the color, (and therefore the surface temperature) of a star. We can also use the ratios of colors to help us quantify the color of stars.

Orion has quite a few colorful stars to attract attention. As mentioned above, the giant Betelgeuse looks quite red, while Rigel looks bluish. The star Bellatrix, (on the opposite arm of Betelgeuse) looks bluish also, (and has a visual mag.=1.64). Many of the other stars appear white from the earth.

A small bluish companion star accompanies Rigel of apparent magnitude 6.7, [2]. Mintaka has a companion star that orbits about itself and actually eclipses Mintaka. The apparent magnitude change is about .2, which is noticeable. Alnitak is part of a triple star system, with companion apparent magnitudes of 1.91 and 5.5.

Some of the stars in Orion also appear diffuse or cloudy. This may affect both their color and brightness. The main reason for this is that clouds of dust and gas, which can reflect light, absorb light, or emit light, surround many of the stars. Bellatrix has a faint nebulosity surrounding itself for example, [2]. The middle belt star Alnilam is also surrounded by a faint nebulosity, which naturally becomes visible when near so bright a star, [2]. A cloud of gas and dust that actually emits light after being excited by the stars themselves also surrounds Alnitak.

In the middle of the sword of Orion we have the famous Orion Nebula. The middle "star"of this

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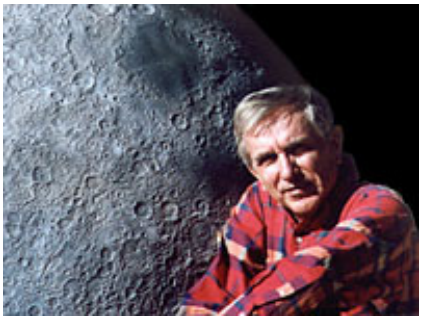
October Guest Speaker: Dr. William K. Hartmann



Dr. William K. Hartmann is known internationally as a scientist, writer, and painter. His research involves origin and evolution of planets and planetary surfaces, and the small bodies of the solar system. Bill Hartmann earned his PhD in astronomy from the University of Arizona. He is the lead author of the current theory about the origin of the moon and has the distinction of being the first winner of the Carl Sagan Medal from American Astronomical Society for popular writing and artwork about astronomy.

Dr. Hartmann is also the recipient of a medal from the European Geophysical Society for his work on Mars. An asteroid was named after him for his work on planet origins and evolution.

Do your Christmas shopping early with EVAC. Some of Dr. Hartmann's books will be available for purchase at the meeting.

New edition of *Grand Tour: A Traveler's Guide to the Solar System*

A Traveler's Guide to Mars

Mars Underground (Science fiction novel about Mars)

Cities of Gold (Historical novel about southern Arizona, Sonora, and the Coronado expedition of 1540, first European exploration of Arizona). Modern story set in Arizona, intertwined with a story of real Spanish characters set in 1539-40.

Dear Governor Janet Napolitano,

I would like to express my thanks and many thanks on behalf of the members of the East Valley Astronomy Club for having vetoed House Bill 2461:

outdoor advertising regulation. As President of EVAC, I had received many emails from individuals regarding the proposed lighting changes and how appalled they were that it made it through the other branches of government and put before you for signature. We are fortunate that you not only have a sense of economic value invested in the dark skies, but of the natural beauty they represent.

Thank you for listening to the neighborhood associations, astronomy clubs, and Arizona's major observatories, and preserving Arizona's dark skies.

Sincerely,

Steven Aggas

President

East Valley Astronomy Club

Mesa, AZ

The Stars in Orion

(Continued from page 4)

sword is actually an interstellar cloud. It is composed of many stars, some of which produce ultraviolet light that cause the gases to glow, [3]. It most often looks reddish in color. Thus the "stars" of Orion are not always ordinary stars at all!

That the stars in Orion look so different from each other" is not as simple as it appears. It also depends on what exactly you mean by the word "star" when referring to Orion. We have seen that the rich variation in apparent stellar brightness and color contained within Orion alone is very noticeable and beautiful. However when combined with the many diverse physical surroundings and actual compositions of the "stars", the true rich beauty and attraction of Orion becomes even more evident.

References

[1] The Stars of Orion, http://www.orion_tab_html-2.html

[2] Burnham, Robert. Burnham's Celestial Handbook-Volume Two. Mineola, NY: Dover Publications Inc. 1978

[3] Kaufmann, William and Freedman, Roger. Universe. New York, NY: W.H. Freeman & Company. 1999

Classified Advertisements

Meade ETX-70

with Meade 9mm and 25mm eyepieces, Autostar, and flex focus. $150.00
Damion Pauksta (602) 240-5421
damionbow@aol.com

NexStar 11 GPS

Carbon fiber model purchased from Astronomics late 2003, unused due to illness. Included with all standard accessories are Feathertouch focuser, 2" AP visual back, JMI Wheely Bars with extra-large wheels and complete Celestron 'gift' set of eyepieces and filters in case. Cost well over $3600 -- will sell for $2000 firm. Prefer local sale.
Norm Rubenstein (623) 322-6464

Construction will begin soon on the Riparian-Rotary Observatory in Gilbert. Check out the website for more info!

www.RotaryObs.org

Celestron NexStar 5 plus Extras

I purchased this telescope last year and have not used it very much (4 or 5 times). The optics are great and the views are terrific for a scope of this size! It is perfect - no blemishes. I am selling the unit because I am continuing to downsize since we had the baby. So I will part with my little-used gem. Too bad, because this 5" telescope is so nice and portable and has GO-TO capability to boot!

The telescope comes with tripod, Nexstar computer controller, airline compliant fitted hard case, tripod, bob's knobs, 1x finder scope, manual, 1-1/4" mirror diagonal, a 25mm eyepiece; the factory box w/form-fitting foam box. There is no box for the tripod.

This telescope, tripod and case equals a replacement cost almost $1,200. I'll take the first $600 OBO. My loss is your gain; thanks for looking and I hope you enjoy using this beauty!

Martin Bonadio 480-570-7163 mbonadio@cox.net

16" f4.5 Meade Starfinder with Equatorial Mount

Optics remounted into a new tube, built by Pierre Schwarr with a JMI focuser. Includes 7, 12.5, 17, 20, and 32mm eyepieces plus 2.8 Klee Barlow, laser collimator and an Olympus OM1 camera.

Many extras! Call or e-mail me for a list. I have $5200 invested in this telescope package, but will sell for $2000

Dave Rainey 602-980-0582 drainey7@cox.net

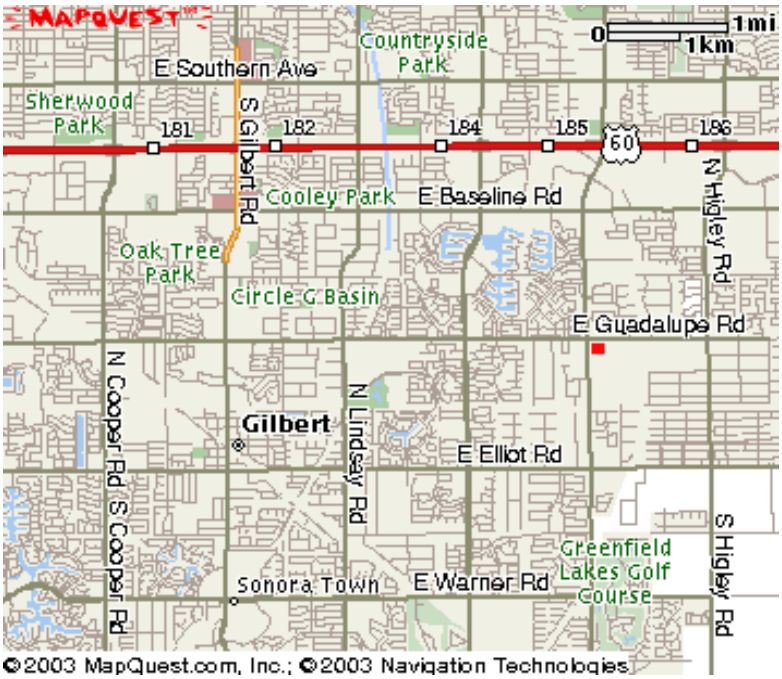
6" Hardin Dob

Here's a great beginner's scope, a 6 inch Hardin Dob, roller bearing azimuth mount, right angle finder scope, 25mm eyepiece, quick collimation cap, all excellent condition. $150

David Hatch 480-854-1593 davidhatchsr@yahoo.com

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!

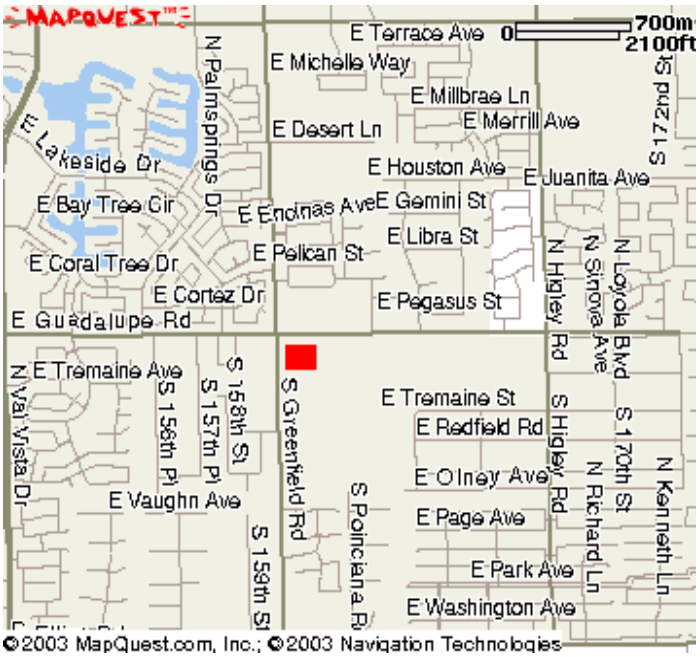
2005 Meeting Dates

October 21

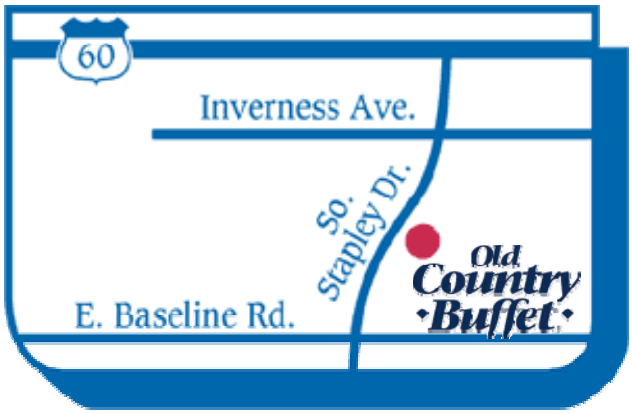
November 18

December 16

Holiday Party



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

OCTOBER 2005

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	29
30	31					

Schedule of Events

- *September 30 - October 1 - All-Arizona Star Party at Farnsworth Ranch*
- *October 14 - Public Star Party at Riparian Preserve in Gilbert*
- *October 21 - General Meeting at Southeast Regional Library in Gilbert*
- *October 22 - Local Star Party at Boyce Thompson Arboretum State Park*

Minutes of September General Meeting

Meeting date: Friday, September 16, 2005

Meeting location: Southeast Regional Library in Gilbert

The meeting was opened at 7:30 PM by President Steven Aggas.

Club officers introduced themselves followed by a welcome message to visitors and new members. This meeting marked the introduction of the distribution of information packets to both visitors and new members.

Announcements: Wayne Thomas provided a Treasurer's report.

Event Coordinator Gwen Grace provided information on the upcoming All-Arizona Star Party. She explained the schedule of events and the activities planned for the hospitality tent. She also coordinated the event pre-registration activities.

President Aggas made an impassioned plea for members to step forward and get involved in the club by seeking office for 2006.

Recognition: Joe Orman and Chris Schur were recognized for having photographs published.

Jon Christensen gave a presentation on how his astrophotography has evolved over the years from film to webcams to CCD imaging. He provided many examples of his fine work and explained how he achieves these results. A very interesting talk indeed.

Nominations for 2006 Offices

President	*Your Name Here*
Vice President	*Your Name Here*
Secretary	*Your Name Here*
Treasurer	Wayne Thomas
Properties Director	Geneieve & Phillippe Normand
Event Coordinator	*Your Name Here*
Event Coordinator	Randy Peterson

Nominations for 2006 Offices

Webmaster	Marty Pieczonka
Observatory Manager	Steven Aggas
Newsletter Editor	Peter Argenziano
Director	Claude Haynes
Director	John Holmquist
Director	Martin Bonadio
Director	Dave Williams
Director	Martin Thompson

Get Involved!

East Valley Astronomy Club -- 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 (select according to the month you are joining the club):

☐ **$20.00** January through March ☐ **$15.00** April through June

☐ **$10.00** July through September ☐ **$25.00** October through December

Includes dues for the following year

Renewal (current members only):

☐ **$20.00** January - December

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) ☐ US Mail

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

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*

_____

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Where No Spacecraft Has Gone Before

by Dr. Tony Phillips

. In 1977, Voyager 1 left our planet. Its mission: to visit Jupiter and Saturn and to study their moons. The flybys were an enormous success. Voyager 1 discovered active volcanoes on Io, found evidence for submerged oceans on Europa, and photographed dark rings around Jupiter itself. Later, the spacecraft buzzed Saturn's moon Titan—alerting astronomers that it was a very strange place indeed! —and flew behind Saturn's rings, seeing what was hidden from Earth.

Beyond Saturn, Neptune and Uranus beckoned, but Voyager 1's planet-tour ended there. Saturn's gravity seized Voyager 1 and slingshot it into deep space. Voyager 1 was heading for the stars—just as NASA had planned.

Now, in 2005, the spacecraft is nine billion miles (96 astronomical units) from the Sun, and it has entered a strange region of space no ship has ever visited before.

"We call this region 'the heliosheath.' It's where the solar wind piles up against the interstellar medium at the outer edge of our solar system," says Ed Stone, project scientist for the Voyager mission at the Jet Propulsion Laboratory.

Out in the Milky Way, where Voyager 1 is trying to go, the "empty space" between stars is not really empty. It's filled with clouds of gas and dust. The wind from the Sun blows a gigantic bubble in this cloudy "interstellar medium." All nine planets from Mercury to Pluto fit comfortably inside. The heliosheath is, essentially, the bubble's skin.

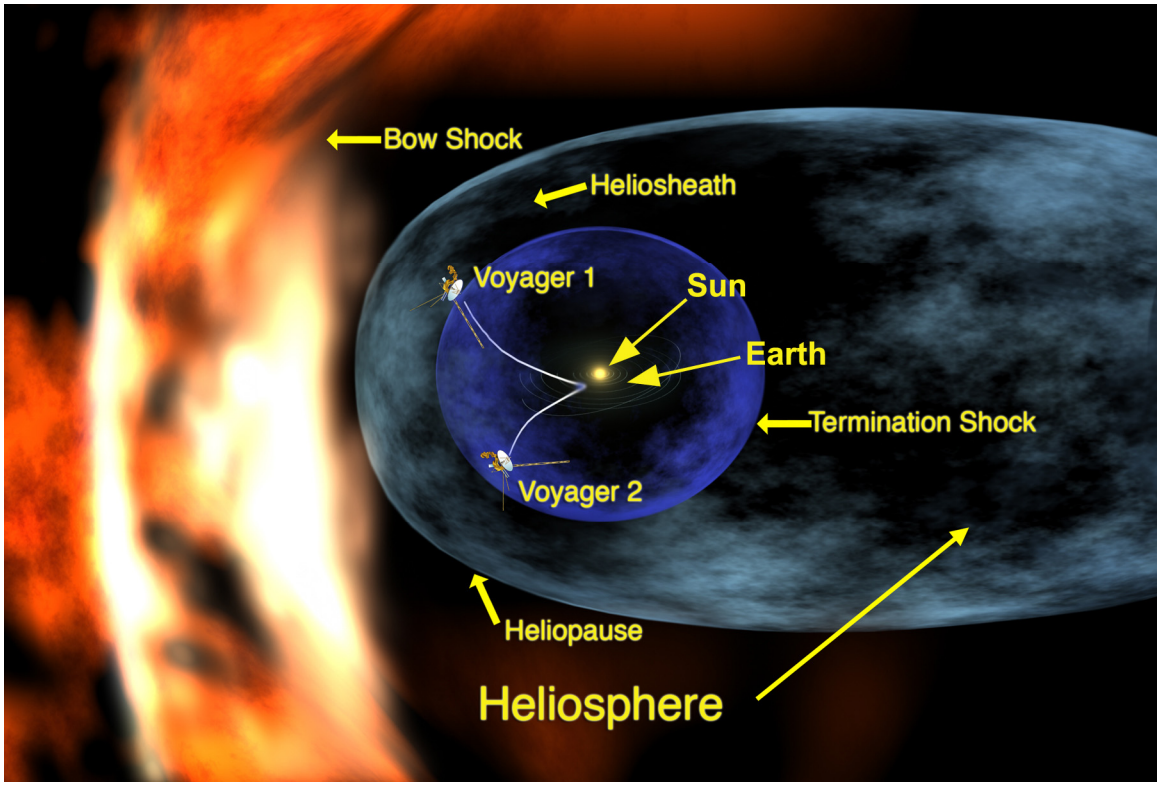
"The heliosheath is different from any other place we've been," says Stone. Near the Sun, the solar wind moves at a million miles per hour. At the heliosheath, the solar wind slows eventually to a dead stop. The slowing wind becomes denser, more turbulent, and its magnetic field—a remnant of the sun's own magnetism--grows stronger.

So far from Earth, this turbulent magnetic gas is curiously important to human life. "The heliosheath is a shield against galactic cosmic rays," explains Stone. Subatomic particles blasted in our direction by distant supernovas and black holes are deflected by the heliosheath, protecting the inner solar system from much deadly radiation.

Voyager 1 is exploring this shield for the first time. "We'll remain inside the heliosheath for 8 to 10 years," predicts Stone, "then we'll break through, finally reaching interstellar space."

What's out there? Stay tuned…

For more about the twin Voyager spacecraft, visit voyager.jpl.nasa.gov. Kids can learn about Voyager 1 and 2 and their grand tour of the outer planets at spaceplace.nasa.gov/en/kids/vgr_fact3.shtml .



Voyager 1, after 28 years of travel, has reached the heliosheath of our solar system.

If it's Clear...

by Fulton Wright, Jr.
Prescott Astronomy Club

October 2005

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.

The season for observing Mars is coming. Here is a table to help you plan for a few months. The altitude at the best time will be about 70 degrees the whole 4 month period. (see Sky and Telescope, September 2005, p. 67 for more detail.)

DATE	BEST TIME	SIZE
Sep 1	4:30 AM	14"
Oct 1	3:15 AM	18"
Oct 30	1:00 AM	20" (closest to earth)
Nov 7	12:15 AM	20" (opposition)
Dec 1	10:10 PM	17"
Jan 1	8:15 PM	12"

On Sunday, October 2, it is new Moon so you have dark skies for all night observing if you like.

On Friday, October 7, about 7:00 PM, you can see the Moon near Antares. With your unaided eye or binoculars look low in the southwest for the pair about half a degree apart. Brilliant Venus is off to the right.

On Sunday, October 16, about 6:45 PM, you can see Venus about 1.5 degrees from Antares, low in the southwest.

On Monday, October 17, early in the morning (ugh) you can see a very slight partial eclipse of the Moon. This is not a flashy event, but if you are up, take a look in the west. Here is the schedule.

3:30 AM First hint of shading from penumbral phase visible

4:34 AM Partial phase starts

5:03 AM Maximum eclipse (only 7% of diameter covered)

5:13 AM Astronomical twilight starts (first light appears in the east)

5:32 AM Partial phase ends

5:42 AM Nautical twilight starts (dim stars no longer visible)

On Monday, October 17, at 6:02 PM (10 minutes after sunset), the full Moon rises. Forget the faint fuzzes tonight and check out the rays and other albedo features on the Moon.

On Tuesday, October 18, after about 8:00 PM, you can see the selenological southeast (celestial southwest) part of the Moon at its best. Libration tips that part toward us.

Remember that the end of October and the beginning of November is the time when Mars is closest to Earth.

New Moon on 3 October at 03:28

First Quarter Moon on 10 October at 12:01

Full Moon on 17 October at 05:13

Last Quarter Moon on 24 October at 18:17

Observing the Deep Impact
by Bob Christ

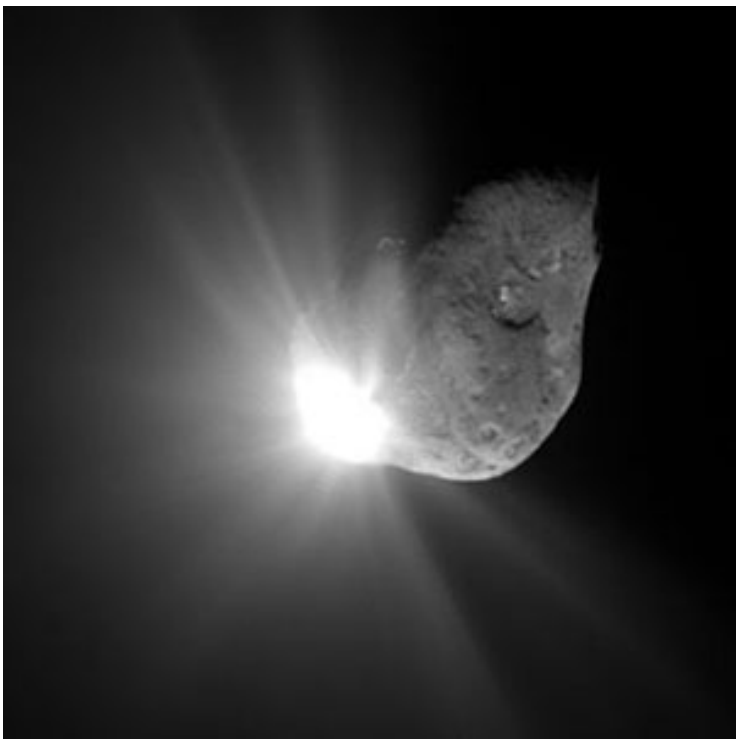
Several weeks prior to the "Deep Impact," I discovered an Ephemeris generator on the JPL Web site (http://ssd.jpl.nasa.gov/cgi-bin/eph). My NexStarGPS does not contain a comet database and I used the generator to calculate the comet's precise position on the night of July 3rd and used the GoToRA function. The generator allows one to input the lat/long coordinates of the viewing location and its altitude. This night I was at 5,200' elevation.

I was fortunate to be able to view the comet from a dark site, about 95 miles North of Phoenix, Arizona. I am far from considering myself to be an experienced amateur astronomer and have been using my NexStarGPS 9.25 for only about 5 months prior to this date, following 1-year of using a Meade ETX-60AT scope. Same game: significantly very much different ballpark.

I aligned the scope on Vega and Alberio as suggested by the scope. Following alignment, I slewed to Spica knowing that it was in close proximity to Tempel 1. I was disappointed with the precision of the result. I then re-aligned the scope on Spica and Jupiter because both were reasonably close to the location of the comet, inputted the comet's co-ordinates, and slewed to the target area.

I was expecting to see a prominent comet structure and its attendant dust and gas tails. No such luck. I caught a view of something in the corner of my eye while I was searching the periphery of my .97* TFOV (36mm 2" Siebert). There it was, – a barely perceptible fuzzy – and in the middle of my FOV! I'm sure without re-aligning the scope I would have been pointed in the wrong location. A fellow club member, whom I had never met, came by and verified I had found the comet. Of the 25-some scopes set up by fellow astronomy club members (most exceptionally experienced), I may have been the first to lock onto Tempel 1. Many came by to peek through my scope (some multiple times) so they too could get a fix on the comet.

I wondered how this fellow could be so immediately confident of my sighting. At the risk of offending him, and exposing my naiveté, I did not question him. Days later I believe I discovered how he knew I was fixed on the comet. An individual, Andrew Johnson, was kind enough to create and make available a "Mag 7 Star Atlas" for downloading (free) at: http://cloudynights.com/item.php?item_id=1052. I had printed the charts as a resource well before Deep Impact and had never used them. (Hey, I have a GoTO Scope, right?) About a week or so after Deep Impact I was looking at a chart covering RA 12h to 16h, Dec +20* to –20* that contained Spica and realized there was no DSO in the area where Tempel 1 was located that night. I'm sure my club member did his "homework," and I learned a valuable lesson – the value of star charts.



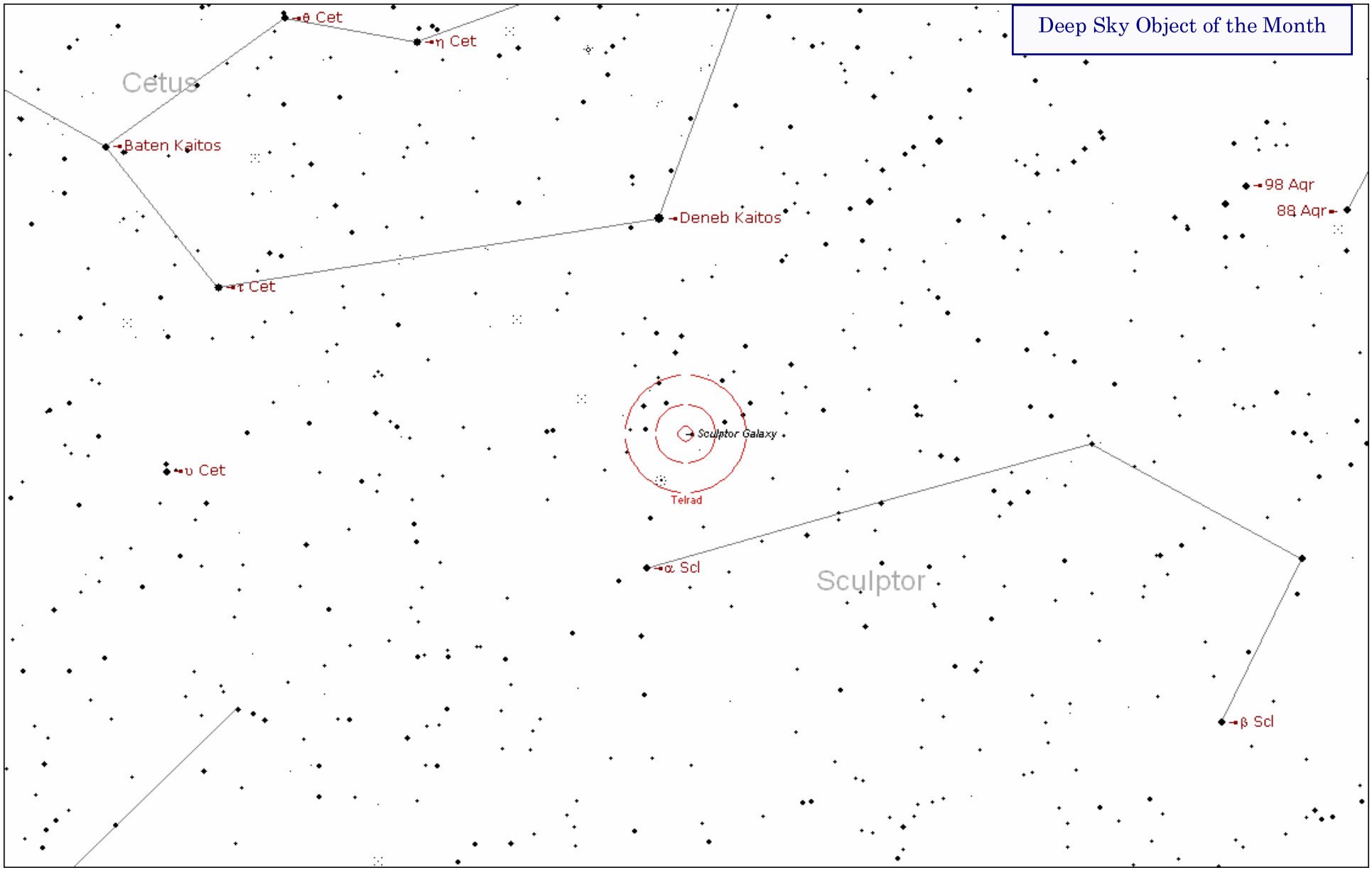
Comet Tempel 1 67 seconds after it obliterated Deep Impact's impactor spacecraft

Upon having sighted Tempel 1, I replace my @" 36mm ocular with a 25mm 1 ¼" eyepiece to get a closer look. There were 2 stars close to the faint fuzzy, located on the right side. When an imaginary line was drawn between those 2 stars extending out to the left, the line passed just over the Tempel 1. The three objects were almost in linear alignment. As I continued to watch, I began to realize the fuzzy was moving! This provided me with further assurance that indeed, I had locked-onto the comet.

At 10:52 MST the impactor collided with Tempel 1. It would take the light at the instant of the impact approximately 7.5 minutes to reach earth and we all watched with eager anticipation. Nothing. A lot of us, me included, expected to see some dramatic change, but it didn't happen. I continued to view the comet and after about 10 minutes began to realize something was happening. I wasn't keeping track of the time because my eye was glued to the eyepiece but a star-like center began to grow in the center of the fuzzy. About 30-40 minutes after impact, the glow from the nucleus of the comet had grown significantly and was equal in brightness to the two nearby stars. By this time the fuzzy had traveled from being in near-linear alignment with the two stars to a position that formed a right triangle when the 3 objects were connected with an imaginary line.

By now the comet had moved low in the Western sky and the crud of earth's atmosphere significantly diffused its visibility from our vantage point. I bid it an appreciative "thank you, and good night." I then took the opportunity to continue to work on the NexStar50 list until about 3:00 AM.

I will long remember the impact of Tempel 1. I was able to successfully view this historic event and I am most grateful for the experience.



NGC 253 (Sculptor Galaxy) Spiral Galaxy in Sculptor

Magnitude: 8.20 Size: 26'.9 x 5'.9 PA: 52° Viewed nearly edge-on

RA 00h 47m 33.1s Dec -25° 17' 18" Mean Surface Brightness: 22.3 mag. / arc-sec^2

It's Time to Look at Mars Again!

Despite some bogus emails swirling around these days, Mars will not be as close to us this year as it was two years ago, but it will be situated higher in the sky. Its positioning above the celestial equator should make for some memorable observational opportunities.

While it is a fact that the closest oppositions of Mars occur when we see the red planet in our southern skies (in Scorpius and Sagittarius), this isn't really the best opportunity to observe the planet for many observers in the Northern Hemisphere. This year Mars will reach opposition in Aries, 15.6° north of the celestial equator. That places the planet 32° higher than at opposition in 2003. This should afford us a better view.

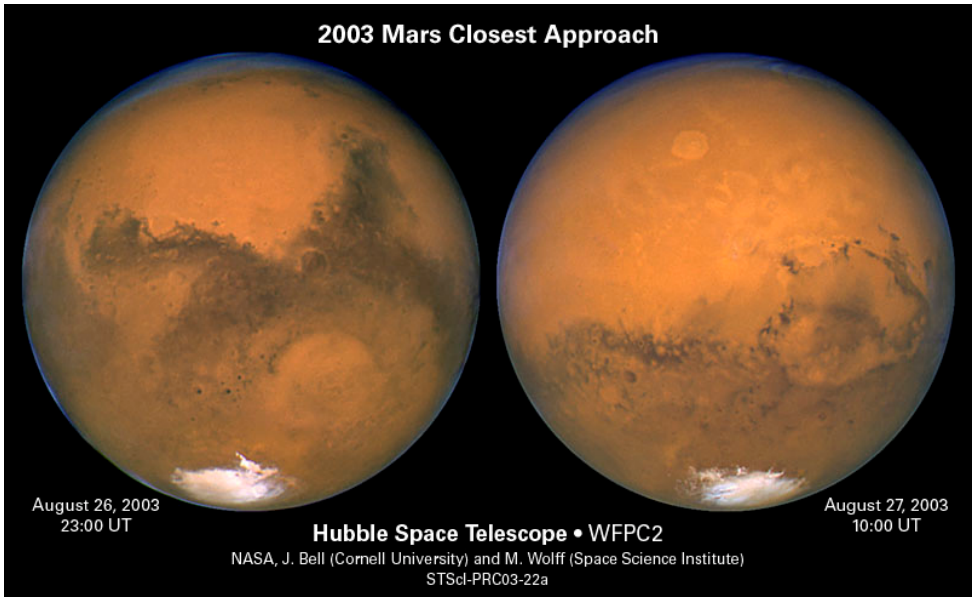
At opposition Mars will be 20.2 arcseconds in diameter… that's almost 5 arcseconds smaller than it was in 2003. Need a little perspective? That's like looking at a volleyball located about a mile from you!

Mars' closest approach to our planet occurs at 9:21 PM (local time) on Saturday, October 29. At this point in time it will be 20.18 arcseconds in diameter. Mars will remain larger than 20 arcseconds through November 6. Mars reaches opposition to Earth at 01:20 AM (local time) on November 07.

The smaller Martian surface details and faint atmospheric phenomena can be observed when the apparent disk diameter exceeds 12 arcseconds. Patience and persistence are the keys to observing subtle details.

As we did in 2003, EVAC is again planning a series of public Mars observing sessions. The site will be the same as used for the monthly public star parties: the parking lot at Water Ranch at the Riparian Institute in Gilbert. Hope to see you there!

Friday October 28	Friday November 11
Saturday November 19	Friday November 25
Friday December 2	Friday December 9
Saturday December 17	Mars Watch



Coming in November… our guest speaker will be local amateur astronomer and author Steve Coe. Steve will regale us with tales of his most recent trip down under to view the southern skies from Australia in preparation for his latest book.

Star Party Disclaimer

The East Valley Astronomy Club (EVAC) is not responsible for the property or liability of any star party participant, nor will the club be held liable for their actions or possessions. EVAC is not responsible for any vehicular damage, theft, or mechanical difficulties that may occur while attending a star party. EVAC strongly recommends adherence to the doctrine of 'safety in numbers' when it comes to remote observing sites. In the interest of safety it is recommended that you don't go to remote sites alone and that someone knows where you have gone each time you go out observing.

The Voyager is published monthly by the East Valley Astronomy Club and made available electronically (PDF) the first week of the month. Printed copies are available at the monthly meeting.

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

Contributions may be edited.

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Keep Looking Up!

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