October 2006

The Voyager

East Valley Astronomy Club

Volume 20 Issue 10

From the Desk of the President
by Steven Aggas, 2006 EVAC President

Hear Ye! Hear Ye! I have three very special announcements for October!

1: The All-Arizona Star Party, will be held on October 20 and 21, both Friday and Saturday nights. New Moon falls on this weekend and if the weather cooperates it should be a fabulous weekend. There are similar events as last year with a pot-luck on both nights, and door prize raffle give-away! New this year, we will have Astronomy Jeopardy! It will be held at the same location south of Arizona City at Farnsworth Ranch. Due to a generous donation by Martin Thompson, we will have our very own canopy to shade a somewhat large group from the Sun. With water coolers, snackies, and good conversation, this should be the *hot spot* of the star party.

2: Gilbert Rotary Centennial Observatory Grand Opening will be held on Saturday, October 21. EVAC has been working hard on behalf of the Riparian Institute and the Town of Gilbert to get the best equipment for the observatory right next door (east) of where our monthly meetings are held, and now it will be open to the public! This is sure to be fun. There is a $25 entrance fee for this 'First Light' event. Call or visit the Riparian for further details, (480) 503-6744, http://www.riparianinstitute.org/public.html.

3: Our speaker for the October meeting will be Wes Lockwood, who will give a presentation titled 'Impact of Solar Activity on the Weather'! Join us at the Southeast Regional Library (Gilbert Public Library) on a special night, Saturday, October 14th, at 7:30PM. The GPL is located at the southeast corner of Greenfield and Guadalupe Roads.

The Backyard Astronomer
Five Great Lunar Craters & Bonus Double Star Feature *by Bill Dellinges*

This month I offer for your observing pleasure five of my favorite lunar craters and five double stars (bonus!) for the fall season. I chose only five craters in the interest of brevity-I'd prefer to share 10 - 15 sometime in a future article. Don't forget old Luna! It offers the most telescopic detail of any object out there. To observe these craters, let's work from right to left of a normal naked view of the moon.

Petavius: Diameter 111 miles, depth (floor to rim top) 13,800', central peak 8,200'. Look for this crater south of conspicuous Mare Crisium on a three day old moon. Don't confuse it with another similar crater, Langrenus, which is located midway between Crisium and Petavius. Tip: use Crisium to measure distance here. Langrenus is one Crisium length south, another Crisium takes you to Petavius. Its distinctive feature, in addition to a multiple central peak, is an interesting cleft or fissure running along the floor from the central peak to the eastern side of the crater rim.

Plato: Dia. 63 miles, depth 3,280'. Sunrise: ½ day past

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Inside this issue:

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- *Public Star Party in Gilbert - October 13*
- *General Meeting at Southeast Regional Library - October 14 (Special Date)*
- *Gilbert Rotary Centennial Observatory Grand Opening Fundraiser - October 21*
- *All-Arizona Star Party at Farnsworth Ranch - October 20 - 21*
- *Local Star Party at Boyce Thompson - October 28*

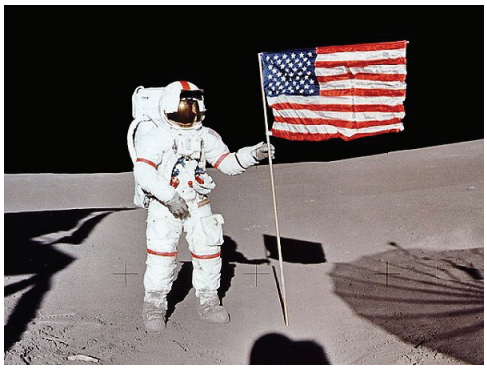
The Backyard Astronomer

(Continued from page 1)

First Quarter. Sunset: ½ day past Last Quarter. Plato is located on the north side of Mare Imbrium imbedded in the Lunar Alps close to the lunar meridian. Plato is one of the best examples of a crater whose interior has been flooded with lava, covering its central peak. Now solidified, it's as dark and smooth as pavement. It's challenging to try to spot the four one mile diameter craters on the floor in a telescope-you'll need high power and good seeing. If you see one, think how difficult it would be to identify Arizona's 4,000' Meteor Crater on the Moon!

Clavius: Dia. 140 miles, depth 16,500'. Sunrise: 1-2 days past First Quarter. Sunset: 1-2 days past Last Quarter. Also close to the meridian, but way down south in the lunar highlands south of Tycho, Clavius is a monster crater. Clavius, like other craters close to the limb, displays an elliptical shape due to foreshortening. An interesting crater chain can be found within Clavius - a series of five craters of diminishing size (34 miles to 6 miles) arcing across its floor. Excluding impact basins like Crisium and Imbrium, Clavius may be the largest crater on the near side of the moon.

Copernicus: Dia. 60 miles, depth 12,600', Sunrise 1.5 days past First Quarter. Sunset 1.5 days past Last Quarter. Located just left of the meridian and up slightly from the equator. The curved mountain range of the Apennines (on the east side of Mare Crisium) lead you right to it. Do not mistake Eratosthenes, at the southern tip of the range for Copernicus-go a tad further. This crater gets my vote for the most beautiful crater on the Moon. Though not one of the largest craters, it has everything you want in a crater-decent size, terraced walls, multiple central peak, a 400 mile long ray system, huge debris field, crater chains, and domes. It doesn't hurt either, to be near the central area of the Moon where it displays a nice circular shape. It is somewhat isolated too, which draws even more attention to it. I suspect my fascination for Copernicus goes back to the amazing photograph of it I saw as a youngster at Lick Observatory. In that observatory's hallowed halls where a series of back lit wall mounted astronomical plates the size of posters. One was a close up of Copernicus taken with the 36" Refractor. I never forgot that image.



Astronaut Alan Shepard raises the flag on the surface of the Moon.

Aristarchus: Dia. 25 miles, depth 9,840'. Sunrise: 4 days past First Quarter. Sunset: 4 days past Last Quarter. Look for this crater in the upper left quadrant of the Moon in Oceanus Procellarum not far from the limb, or to the upper left of our old friend Copernicus. This is the brightest crater on the Moon due to its youthful age of about 500 million years. The upturned lunar "soil" from the meteor impact, as in the case of Tycho and Proclus, hasn't had time to be darkened by solar and cosmic radiation. Besides brightness, another claim to fame of Aristarchus is the adjacent Schroter's Valley, a 100 mile long sinuous rille (longest on the Moon) just northwest of Aristarchus. The whole complex is an awesome sight in a binoviewer.

If you get a chance, check these interesting craters out.

Special bonus feature this month!

It's not too late to knock off a couple summer doubles and upcoming fall doubles. Here we go. Key: RA/Dec, SAO#, Primary/secondary magnitude, Separation in arc seconds, and Position Angle.

Nu Draconis (Kuma) - 17h 32m +55° 10'. SAO 30447. AB 4.9, 4.9, Sep 62" PA 312°. A neat equal magnitude double easily split in even binoculars. Like oncoming car "headlights", or cat's eyes in a dark alley. Wide white pair.

Gamma Delphini - 20h 46m 39s +16° 07' SAO 106475. AB 4.4, 5.2, Sep 9.4" PA 65°. The "nose" of the dolphin is a beautiful yellow pair of stars. Nice at 60x in an 85mm telescope.

Zeta Aquarii – 22h 28m -0° 01'. SAO 146107. AB 4.2, 4.3, 2.1" (widening) PA 192°. The central star in the "propeller" of Aquarius. A difficult pair to split cleanly . Sloppy separation in C14 at 230x.

Gamma Arietis (Mesarthim) – 1h 53m 32s +19° 18'. SAO 92680. AB 4.6, 4.6, Sep 7.6" PA 0°. Most western and faintest of three main stars of Aries. Wonderful equal magnitude white vertical pair. Split at 37x in 20x100 binos and C14 at 98x.

Gamma Andromedae (Alamak) – 2h 03m 54s +42° 20'. AxBC 2.3, 5.0, Sep 9.6" PA 63°. A and BC are Albireo-like, yellow and blue. Easily split in an 85mm scope at 60x. If you have the HST at your disposal, you might split the BC pair: 5.0, 6.3, Sep 0.3" (and closing!) PA 103°. I have never come close to splitting this guy, not even a hint of a figure eight. Quite a challenge. It was widest at 0.6" in 1998. (2010= 0.2", 2015=0.1", 2020=0.3", 2025=0.4", 2030=0.5" - I'll try this last one when I'm 87).

OK folks, this should keep you out of trouble for a while. Good night and good luck.

Pluto: Planet or Not?
by Laurice Dee, Ph.D.

News Flash:

Pluto's status as the 9th planet in our solar system is up in the air.

IAU Meeting: The Pluto Issue

I'll bet that many of you have read accounts about the debate as to whether Pluto should continue to be a planet or not. As of this writing, about 2500 astronomers from 75 countries are currently meeting in Prague, Czech Republic for the International Astronomical Union convention. During the next 12 days, scientists are expected to work on an agreeable universal definition for what qualifies as a planet.

A Little Bit of History on Pluto

The smallest, coldest, and most distant planet from the Sun was discovered by Clyde Tombaugh in 1930. Pluto was given its planet status since it orbits the Sun. Its companion moon, Charon, was discovered by two astronomers, James Christy and Robert Harrington, in 1978.

For decades, Pluto and Charon have been mentioned as members of our celestial neighborhood in textbooks and educational materials on the solar system. Many people have always regarded Pluto as the most distant planet in our solar system with its small size, icy composition, and strange orbit. Even if Pluto is very little known, the public, as well as the space community, have always considered Pluto as one of the 9 planets without even thinking about the exact definition of what a planet in our solar system should be.

Better Definition Needed: Reasons

Confusion arose when an object larger and farther away than Pluto was discovered last year. Xena is the object's current nickname. For decades, our solar system has always been defined as having 9 planets, and the definition of whether an object is a planet or not has always been general: large and round that orbits the Sun. Because of the most recent discovery, many scientists feel that a new definition is needed, since Pluto is smaller than both Xena and our Moon.

Those that attend the IAU convention will take into consideration the following when working on a new definition: mass, size, orbital path, and distance from the Sun. Some scientists felt that Pluto should not be considered as a planet, and others believed that Pluto should retain its planet status. The latter group suggested that planets should be classified into categories based on composition similar to the way stars and galaxies are classified. For example, Jupiter can be regarded as a gas giant planet, and Pluto can be considered as an ice dwarf planet.

I totally agree with the latter group and their idea on planetary classification. It occurs to me that the solar system is quite "organized" with the way it was formed billions of years ago. With the Sun being in the center of our solar system, the first four planets (Mercury, Venus, Earth, and Mars) are rocky planets, and the next four planets (Jupiter, Saturn, Uranus, and Neptune) are gas giant planets. Pluto, as well as other similar objects, would have been icy dwarf planets. If such idea comes through during the meeting, Pluto being stripped of its planet status will not happen. I would like to share an analogy that would make much sense in terms of classifying planets in our solar system.

Artist's concept of the New Horizons spacecraft during its planned encounter with Pluto and its moon, Charon.

Image credit: Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute (JHUAPL/SwRI)

Analogy

One hundred couples are attending a formal dinner/dance to ring in the new year. The dress code for the 100 women is formal dress only. Each woman may wear a dress that is made of any kind of fabric. Dress of any style can be worn. However, it is revealed that only 99 women are wearing long dresses. One woman comes in wearing a short black cocktail dress. Hey, wait a minute! That woman is not wearing a long dress like the other women do. However, her outfit is still a formal dress, even though she does not wear a long dress.

As far as planetary comparison goes, Pluto is like the "little black dress"

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AGN and Multi-Wavelength Astronomy

by Henry De Jonge IV

INTRODUCTION

We will look at the multi-wavelength/energy study of AGN, (active galactic nuclei) and discuss its need and importance in modern day astronomy as well as the current physical limitations and data voids of such studies. We will also imagine what we would like to have in an ideal observatory, including present day instruments, in order to thoroughly study AGN in a multi-wavelength/energy manner.

WHY MULTI-WAVELENGTH

Active galactic nuclei, (AGN) are extragalactic energy sources mainly associated with the nuclei of galaxies, although in the most distant objects the host galaxy may be too faint to be seen. AGN include the centers of such objects as quasars, blazars, Seyfert galaxies, and radio galaxies. AGN are also physically small as well, because their large luminosities frequently change dramatically within a year, [1]. They are also normally very far away with redshifts of .06 to 6.28, with most at redshifts > .3, (more than 3 billion light years from earth!). Their spectra are predominately produced by nonthermal processes and usually have the intensity of the radiation decreasing with increasing frequency, with no single frequency seen as a maximum, [1]. Non-stellar processes in many wavebands dominate their noticeable emissions. Thus there are many unusual conditions and demands upon observation of AGN compared to inner galactic observations.

AGN exhibit significant emission in nearly all wavebands studied to date, from the hard X-ray and gamma ray, to the far infrared, [2]. It is only in closer inspection that we can distinguish a number of features such as bumps and dips that consistently recur from one AGN to the next. AGN spectra are usually noted for such general features as: [2]

The "big blue bump", (roughly from 4000A to 1000A). It is not known if this extends into the EUV due to our galaxy being opaque at 912A and at about 100A due to absorption by neutral H.

A near IR inflection dip between 1um and 1.5 um.

An infrared bump after about 1um.

A slightly variable, sub millimeter break, marking a sharp drop in emission. This is one of the strongest features in normal quasar spectra. It is quite different for radio quiet Vs radio loud quasars.

A power law, (negative exponential) spectrum in the X-ray region from about 1 KeV to a cutoff at about 100 KeV.

A soft x-ray excess, describing an emission component, observed below about 1 KeV. This is common in Seyfert galaxies

We see that the range of notable AGN spectral features covers the complete electromagnetic spectrum. The origins of these listed features in the SED, (spectral energy distribution) of AGN are still not well understood and will yet play a major role in any complete understanding of AGN. Thus the continuing need for multi-wavelength observations.

To extend this energy range even further, AGN are also believed to produce some of the most energetic cosmic rays ever detected, supposedly from their super massive black holes and accretion disks. This would involve the study of ultra high-energy neutrinos, (energies up to 1020 eV). This is currently being done by looking at the interactions of such neutrinos with ice molecules in the Antarctic icecap, (RICE experiment) based upon the principles of radio coherence, [5]. Direct experimental evidence of such ultra high-energy particles would be used to support AGN theories as well as to probe the universe in a new energy domain. We see that the desired energy spectrum for study of AGN goes from the shortest wavelength to actual particles.

LIMITATIONS

We know some of the physical limitations of current multi-wavelength analysis in studying AGN due to our own galactic H absorption. Other physical limitations for example in the x-ray region are both cold and warm absorbing ionized material in the line of sight [2].

In the optical bands there is the absorption and emission of intervening material to contend with and this is notable for AGN's in making an accurate determination of the true spectral slope in these regions. The host galaxy effects are also thought to play a major role in this limitation, especially for low luminosity AGN, [2].

Regarding data limitations, in the optical bands and medium X-ray bands, AGN are noted for their variations over such short terms of weeks or months. These variations have not been accurately correlated for the most part to other emissions in the soft X-ray and DUV regions. There also exists a large gap in the data between the UV, EUV, and soft X-ray regions, [2].

In the IR regions, if the future data is accurate and continuous enough we may be able to determine the exact origins of the thermal emissions in AGN. We may also be able to determine the nature and geometry of the

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Messenger and New Horizons

by Laurice Dee, Ph.D.

A Quick Preview…

Two spacecraft are traveling opposite from one another. One is currently traveling toward the inner solar system, and the other will eventually reach the edge of the solar system in the very distant future after investigating certain objects during its mission. Each one of them will require different energy source for scientific operations during its respective mission. Both of them will collect data from their observations of planets that they are destined for. These two planets are in the extreme spectrum of our solar system. One spacecraft will be an orbiter, whereas the other is designed to fly past objects that are being studied. One of the spacecraft will always be very close to the Sun during its mission, and the other will view the Sun as a point of light the further it travels in space.

What are MESSENGER and New Horizons?

The spacecraft for the MESSENGER mission will eventually orbit Mercury, the closest planet to the Sun, after traveling toward the inner solar system from Earth. The abbreviation MESSENGER stands for MErcury, Surface, Space, ENvironment, GEochemistry, and Ranging. It is a scientific investigation of Mercury which highlights the broad range of scientific goals. The goals are listed in the following website: http://messenger.jhuapl.edu/. The exploration of Mercury will help us to better understand our own planet in terms of planetary formation (as well as the outcome of its processes) and magnetic field generation.

As part of the New Horizons mission, the spacecraft will reach Pluto, the most distant planet in our solar system, and the Kuiper Belt after years of space travel. Since Pluto has never been investigated, the spacecraft will spend several months studying its surface and atmosphere in their entirety before, during, and after the planetary flyby. The closest approach to Pluto will be a mere 6000 miles away from the little planet. Icy objects from the Kuiper Belt will be investigated after New Horizons leaves Pluto and enters the Kuiper Belt. The mission, formerly called Pluto-Kuiper Express, has finally come through after years of proposals and pilot studies, as well as some real trying times with the government who almost dropped the mission funding for good. Further information about this mission can be found in http://pluto.jhuapl.edu/index.php.

Spacecraft Characteristics: Similarities and Differences

Both spacecraft are economy types that are very highly focused on achieving their mission objectives. They are nowhere near as large and complex as the ones for the Galileo and Cassini missions.

The basic components for both spacecraft are as follows: communications, propulsion, command and data handling, instruments for scientific investigation, and devices for star tracking and attitude determination during space travel. MESSENGER and New Horizons will put their instruments to use for remote sensing, as well as for radio science and dust/particle studies, during their missions.

Because MESSENGER and New Horizons will encounter different regions of our solar system during their missions, they are both equipped with different items that would allow them to operate comfortably while in space. Since Mercury is so close to the Sun, the MESSENGER spacecraft has the sunshade (made out of heat-resistant ceramic cloth) in place so as to protect the subsystems and instruments from direct sunlight. All the instruments will be facing down to take measurements of Mercury and its hot, pockmarked surface. MESSENGER is currently using solar panels to receive energy from the Sun for electrical power to the instruments and subsystems.

Unlike MESSENGER, the New Horizons spacecraft is completely covered with thermal blankets so as to protect its entire body from the cold while traveling away from the Sun. Since the spacecraft will not be able to receive enough energy from the Sun due to the extreme distance, it would be too impractical for New Horizons to be equipped with solar panels like MESSENGER. Instead, New Horizons is sporting its sophisticated RTG, which stands for Radioisotope Thermoelectric Generator. The RTG carries plutonium pallets whose heat is being converted into electricity during the decaying process. (The spacecraft for the Cassini mission to Saturn carries 72 pounds of plutonium in three RTG canisters.)

Mission Timelines for MESSENGER and New Horizons

MESSENGER was launched on 3 August 2004 from Cape Canaveral Air Force Station, Florida. The spacecraft would have traveled more than 6.5 years before it performs the Mercury Orbit Insertion (MOI) maneuver to get into orbit around Mercury in March 2011 . Planetary flybys are required so that the spacecraft would be in a better position to get to Mercury. The flybys are as follows: Earth (August 2005), Venus (October 2006 and June 2007), and Mercury (January 2008, October 2008, and September 2009). Instrument calibrations and some data collection will be performed during the flybys.

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There and Back Again
by Peter Argenziano

I have often wanted to attend one of the big star parties in Texas, and decided that this was the year. So, shall it be the Texas Star Party or the Okie-Tex Star Party? After considerable deliberation, I decided it would be the latter. I would attend the 23rd annual Okie-Tex, held at Camp Billy Joe (located just outside Kenton, Oklahoma). This year's event was scheduled for September 16 through 24. I planned to attend on the 21st through the 24th.

I left the valley on the morning of the 20th, driving through Payson, Heber, Holbrook, Gallup, Albuquerque, Santa Fe, Las Vegas, Clayton and Kenton for a total of 750 miles. I arrived on the afternoon of the 21st under a cloudy sky. Apparently I had missed the really windy conditions earlier in the day, with gusts up to 75 mph.

As the afternoon progressed the clouds lingered, but the wind subsided. I unloaded my trailer and set up camp. I assembled my telescope in the hopes of observing under the great conditions I often read about. The early evening hours offered sucker holes in the clouds and I obliged for awhile. I soon decided to get some rest and upon arising at 1:00 am to clear skies, I readied myself for some observing. Out came the eyepiece case and charts. I soon experienced something I hardly ever encounter here at home: dew. Being totally unprepared for the unexpected moisture, I finally called it quits around 5:00 am.

Okie and Tex, the camp mascots

Friday morning was overcast. I took a short hike to the top of a nearby hill, a site frequented by two pink flamingos and a mock reflector.

The afternoon brought increasing cloudiness and light rain. These conditions continued into the night. Since there would be no observing, the big tent used for the speakers became an impromptu cinema where attendees could watch movies.

Saturday started out clear, but the cloudiness increased as the day progressed. It appeared that the event's last day would be a bust, so I packed up and left after the swap meet.

While it was not quite the observing event I was looking forward to for so long, it was an enjoyable trip nonetheless. I got to meet the two people responsible for making my telescope possible: Dave Kriege of Obsession and John Hudek of Galaxy Optics. I also met Randy Cunningham of Astrosystems and Bill Tschumy, the author of the software program *Where is M13?* Throughout my stay I encountered folks whom I had previously only known through various online users groups. And I made the acquaintance of many fellow amateur astronomers, including David Tosteson, who made the trip from Minnesota with the largest scope on the field, a 32" f4 dob; and Jeff Thibodeau, president of the Oklahoma City Astronomy Club, which sponsors this star party.

The facilities at the star party include a vendor hall; a large tent for the guest speakers; indoor bathrooms with showers; porta-potties strategically located across the observing field; and a Cosmic Café that was open nightly from 10:00 pm to 3:00 am. Attendees could pre-purchase meals prepared onsite by the Cimarron Heritage Center from nearby Boise City, so three squares were available daily.

The area also features attractions such as Capulin Volcano; a rancher with an extensive collection of petrified wood; a visible section of the K-T boundary layer; as well as the fossilized remains of dinosaurs from the Jurassic and Triassic periods.

We often hear how dark and transparent the skies are at the sites of the big southwestern star parties. I was really looking forward to being able to make the comparison to our own great skies… but it was not to be, at least not this year.

October Guest Speaker : Dr. Wes Lockwood

After completing his undergraduate studies in Physics at Duke University, Wes Lockwood earned Masters and Doctorate degrees in Astronomy from the University of Virginia.

After graduation, Dr. Lockwood served as a Research Assistant at Leander McCormick Observatory, and then as Assistant Astronomer at Kitt Peak National Observatory. He has been an Astronomer at Lowell Observatory since 1973.

Dr. Lockwood has served as Guest Investigator at several observatories over his career. His professional affiliations include American Astronomical Society, American Geophysical Union, American Association for the Advancement of Science, International Astronomical Union and International Dark Sky Association. Dr. Lockwood has authored over 150 publications, and has consulted for NASA, NSF, AAS Committee on Light Pollution, Radio Interference and Space Debris, and the Smithsonian Astrophysical Observatory Fellowship

Dr. Lockwood's major research interests include luminosity of the Sun, stars similar to our Sun, how solar variations affect Earth's weather and climate, and the study of the giant planets. Dr. Lockwood uses photoelectric photometry to measure the brightness of celestial objects with a precision achieved at few other observatories today.

Dr. Wes Lockwood will give a presentation on the "Impact of Solar Activity on the Climate."

2007 Officer Nominations

The October general meeting marks the date of official announcement for nominations of candidates for club offices in 2007. Nominations remain open until the beginning of the November meeting.

Elections will occur at the November meeting.

As of press time the docket of candidates is as follows :

President: *Your Name Here*

Vice President: Michael Prator

Secretary: *Your Name Here*

Treasurer: Bill Houston

Director: Howard Israel

Director: Martin Thompson

Director: Claude Haynes

Director: Dave Coshow

Director: Ray Heinle

Property Director: David Hatch

Event Coordinator: Stu Hopper

Event Coordinator: Randy Peterson

Webmaster: Marty Pieczonka

Newsletter Editor: Peter Argenziano

Observatory Manager: Steven Aggas

Please remember that any position may be contested.

For more information on this mission visit the New Horizons website:

http://pluto.jhuapl.edu/

New Horizons Timeline

January 19, 2006: Launch

February 2007: Jupiter close approach and gravity assist

March 2007 - June 2015: Interplanetary cruise

July 2015: Pluto - Charon encounter

2016 - 2020: Kuiper Belt Object encounters

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Ads should be emailed to: news@eastvalleyastronomy.org

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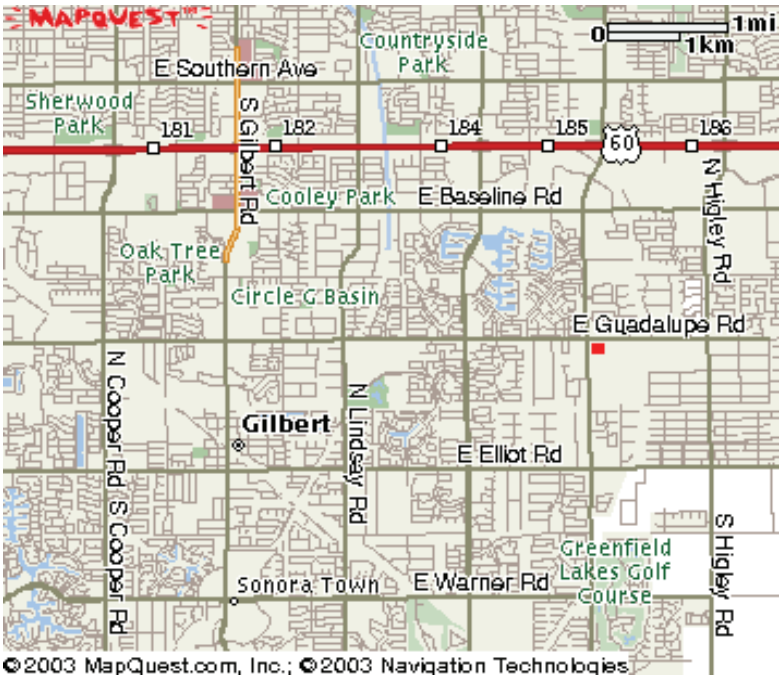
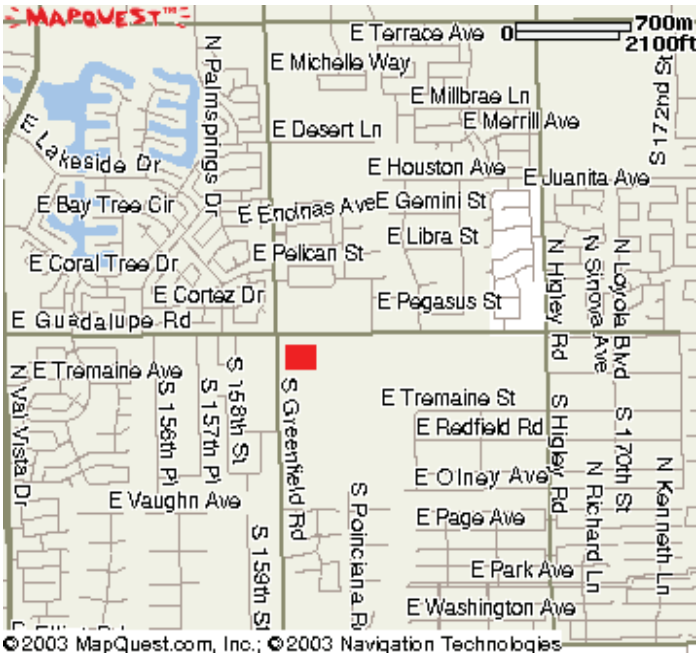


The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

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!



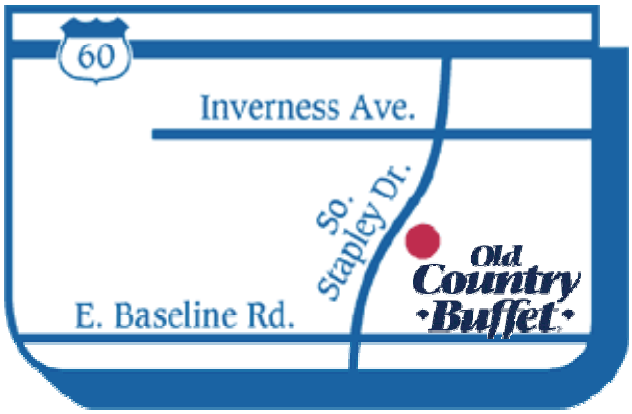
2006 Meeting Dates

October 14 ***Special Date to Accommodate the All-Arizona Star Party***

November 17

December 15

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 2006

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

- *October 13 - Public Star Party at Riparian Preserve in Gilbert*
- *October 14 - General Meeting at Southeast Regional Library in Gilbert. Please note special date to accommodate AASP*
- *October 21 - First Light Grand Opening fundraiser at Gilbert Rotary Centennial Observatory*
- *October 20-21 - All-Arizona Star Party at Farnsworth Ranch*
- *October 28 - Local Star Party at Boyce Thompson Arboretum State Park*

Minutes of September General Meeting

Meeting date: Friday, September 15, 2006

Meeting location: Southeast Regional Library in Gilbert

President Steven Aggas opened the meeting with the introduction of Board members, after which five guests introduced themselves. 70 people attended the meeting.

Events Coordinator Randy Peterson mentioned that the next school events are scheduled for November. Our semi-annual Adopt-a-Highway will be done on either November 4 or December 2. A transit of Mercury will occur in the afternoon hours of November 8. We would like solar telescopes set up at the Gilbert Rotary Centennial Observatory (GRCO).

Win Pendleton described a very productive day with the GRCO in which he and Martin Thompson set up not only the rack and the computer, but the mount and telescope as well. Just prior to the meeting, the telescope in its new home produced focused star images. Please sign up if you wish to become a telescope operator. Training begins on September 23 and 24. The observatory's grand opening, a fundraising event with speeches and food, occurs on October 21.

Next up, Gwen Grace spoke about the All Arizona Star Party, which will happen on October 21 and 22 at the Farnsworth Ranch site south of Arizona City. This year, we will have a hospitality tent, and taco dinner on Saturday, as well as a pot luck on Friday.

Following Wayne Thomas' report from the treasurer, Steven showed which club offices will be available for 2007. All four of the executive offices will be vacant, so please consider helping out the club.

Next month's meeting will be held on a special date, October 14, in which Wes Lockwood will come from Lowell Observatory to tell us about solar activity and its effect on the climate.

Howard Israel moderated the beginners' Q&A session, which included great questions about eyepiece focal lengths, sun filters, and multiple-exposure imaging.

Following the break, Peter Argenziano was presented with an observing award for completing the EVAC planetary nebula program.

Silvio Jaconelli then introduced the night's main speaker, Gerry Rattley. A veteran of seven solar eclipses, Gerry described aspects of his trips to exotic locations such as Indonesia and Australia. Gerry loaded up the projector with his second tray of slides to discuss his trips to Turkey and New Orleans.

East Valley Astronomy Club -- 2006 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

☐ **$15.00 Individual** July through September

☐ **$17.50 Family** July through September

☐ **$22.50 Individual** April through June

☐ **$26.25 Family** April through June

☐ **$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

Staggering Distance

by Dr. Tony L. Phillips

Tonight, when the sun sets and the twilight fades to black, go outside and look southwest. There's mighty Jupiter, gleaming brightly. It looks so nearby, yet Jupiter is 830 million km away. Light from the sun takes 43 minutes to reach the giant planet, and for Earth's fastest spaceship, New Horizons, it's a trip of 13 months.

That's nothing.

Not far to the left of Jupiter is Pluto. Oh, you won't be able to see it. Tiny Pluto is almost 5 billion km away. Sunlight takes more than 4 hours to get there, and New Horizons 9 years. From Pluto, the sun is merely the brightest star in a cold, jet-black sky.

That's nothing.

A smidgen to the right of Pluto, among the stars of the constellation Ophiuchus, is Voyager 1. Launched from Florida 29 years ago, the spacecraft is a staggering 15 billion km away. It has traveled beyond all the known planets, beyond the warmth of the sun, almost beyond the edge of the solar system itself.

Now that's something.

"On August 15, 2006, Voyager 1 reached the 100 AU mark—in other words, it is 100 times farther from the Sun than Earth," says Ed Stone, Voyager project scientist and the former director of NASA's Jet Propulsion Laboratory. "This is an important milestone in our exploration of the Solar System. No other spacecraft has gone so far."

At 100 AU (astronomical units), Voyager 1 is in a strange realm called "the heliosheath."

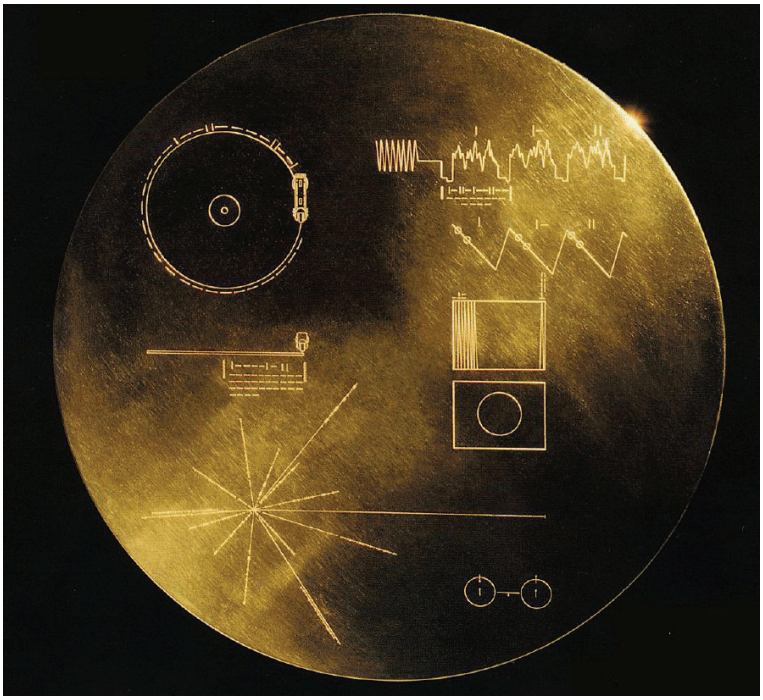
As Stone explains, our entire solar system—planets and all—sits inside a giant bubble of gas called the heliosphere. The sun is responsible; it blows the bubble by means of the solar wind. Voyager 1 has traveled all the way from the bubble's heart to its outer edge, a gassy membrane dividing the solar system from interstellar space. This "membrane" is the heliosheath.

Before Voyager 1 reached its present location, researchers had calculated what the heliosheath might be like. "Many of our predictions were wrong," says Stone. In situ, Voyager 1 has encountered unexpected magnetic anomalies and a surprising increase in low-energy cosmic rays, among other things. It's all very strange—"and we're not even out of the Solar System yet."

To report new developments, Voyager radios Earth almost every day. At the speed of light, the messages take 14 hours to arrive. Says Stone, "it's worth the wait."

Keep up with the Voyager mission at voyager.jpl.nasa.gov. To learn the language of Voyager's messages, kids (of all ages) can check out spaceplace.nasa.gov/en/kids/vgr_fact1.shtml .

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



In case it is ever found by intelligent beings elsewhere in the galaxy, Voyager carries a recording of images and sounds of Earth and its inhabitants. The diagrams on the cover of the recording symbolize Earth's location in the galaxy and how to play the record.

AGN and Multi-Wavelength Astronomy

(Continued from page 4)

interfering dust and other accreting material.

IDEAL OBSERVATORY

It seems that in order to accurately model and better understand AGN we need to correlate accurate data from as wide a variety of sources as possible. The correlation of optical images and spectra to other wavelength regions is also very critical. It would be desired to have both space based, (HST) and high resolution ground based, (large array or binocular telescopes) optical imaging systems for such analysis. The HST has actually produced images of accretion disks and bipolar jets. The exact locations of emitting energy in AGN are critical to their understanding.

An idea that is already being applied is the WEB telescope-using a network of optical observers around the world to continuously monitor AGN, [7]. Thus there would not be any "one" fixed observatory in the classical sense. This could also be applied to other wavelength regions and would complement the space-based instruments.

We would also like a very accurate spectroscopic system in many wavelength bands, in order to determine more about the velocities and temperatures associated with AGN as well as their composition and that of the intervening material. For AGN, in many energy bands, the presence or lack of emission lines and their width is used extensively in their classification.

It was the strong radio emission of AGN that lead to the discovery of quasars in the 1960's. The majority, (85-90%) of known AGN are called radio quiet. This does not mean they are radio silent but rather are actually radio weak, as they are still detectable in the radio bands, but with 3-4 orders of magnitude smaller radio emissions compared to their optical outputs, [8]. Radio telescopes would of course still be needed, especially in correlating their variations with other energy bands like X-rays. The ability to detect radio polarization would also be desired, especially in the study of the bipolar jets sometimes seen with quasars. Radio telescopes could also be used to detect the magnetic fields and structures of AGN such as blazars and AGN jets. Radio telescopes like the VLA can also offer higher angular resolution. Some of the more common regions of radio study are at 15, 22, 37, and 43 GHz.

It is obvious that satellites will play a major role in any such observatory due to the blocking effects of the earth's atmosphere in the X-ray, gamma ray, UV, and certain IR regions. X-ray data and correlations (especially in regards to any accretion disk model of AGN) are particularly needed and important. AGN are strong gamma ray emitters, (energy > 100 MeV), [8], and soft X-ray absorption is used for analysis of such elements as C and O.

A detector in the IR (from 5 to 500 um) would be needed also, as a substantial fraction of the bolometric luminosity of many quasars is emitted in the IR, [6]. Again the correlation of variations in other energy bands would be important for any AGN modeling.

It would be nice to have some detectors with a wider FOV in order to monitor a larger portion of the sky effectively. Such an example is the AGILE satellite with three wide FOV, (about 3 sr) detectors for gamma rays, (30 MeV to 50 GeV), hard x-rays, (10-40 KeV), and a non-imaging mini-calorimeter, (0.3 to 200 MeV), [3]. This satellite can more readily detect both off axis energy sources and fast changing energy sources, (like flaring AGN's), as well as monitor simultaneous AGN variability in its detection bands.

An energy band with little current study is the 50-250 GeV range, (gamma rays). This should also be included in our observatory. It is currently being done with the STACEE detector, (ground based with heliostat mirrors) and is very applicable to blazer emission studies, (TeV blazars). It bridges the energy range between ground based and space based AGN energy studies, [4].

More accurate optical measurements of red shift would be desired and the HST could perform more accurate surveys than most ground based telescopes.

Thus our complete, ideal, and continuous, multi spectral observatory includes both space and ground based instruments in dispersed physical locations, with both small and wide FOV's, spectral analysis capability in all bands, and neutrino detection capabilities.

CONCLUSION

It is clear that in order to study and understand AGN more completely and to generate more accurate models, we must obtain as much data as possible in a wide spectrum. This spectrum stretches from the x-ray and gamma ray bands, to the IR and radio regions, and also includes such particles as neutrinos.

Unless the data over such a wide region is obtained it will continue to be difficult to physically understand AGN even though we can do many

(Continued on page 19)

If it's Clear...

by Fulton Wright, Jr.
Prescott Astronomy Club

October 2006

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 Friday, October 6, at 5:54 PM (13 minutes before sunset) the full moon rises making faint fuzzies hard to see all night. This is an almost "perfect" full moon. The instant of full moon is 8:13 PM and the libration (tipping) of the moon is near zero, so you will see the entire surface as shown on most moon maps.

On Monday, October 9, from about 8:45 PM till 11:00 PM, you can see the Moon occult bright stars in the Pleiades star cluster. Stars will disappear along the bright limb of the Moon so you will want at least a small (3 inch) telescope and at least 50x magnification to follow them. (Bigger and more powerful is, of course, better.) Reappearances on the dark limb will be easier to see. Here is an approximate schedule if you are in Prescott:

7:43 PM gibbous Moon rises
8:48 PM 17 Tau (mag 3.7) disappears
9:10 PM 23 Tau (mag 4.2) disappears
9:33 PM 17 Tau (mag 3.7) appears
9:39 PM Eta Tau (mag 2.8) disappears
9:58 PM 23 Tau (mag 4.2) appears
10:29 PM 28 Tau (mag 5.0) disappears
10:32 PM Eta Tau (mag 2.8) appears
10:59 PM 28 Tau (mag 5.0) appears

With a big telescope and high power you might see some other stars appear just before the 10:32 PM event. After the 10:29 event look just south of the Moon's equator, along the dark limb for the first, dim star to appear. Half a minute later a second, brighter star should appear below the first. One minute later a third, dim star should appear to the left of the first one. Half a minute later the big event occurs below the group of 3 stars.

On Friday, October 13, (perfect for the demon star) at 9:48 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.

On Saturday, October 21, it is new moon so you have the whole evening to look for faint fuzzies.

On Tuesday, October 24, about 6:15 PM, you might be able to see 2 planets and the Moon together. With binoculars look low in the southwest for Jupiter (mag -1.7), Mercury (mag 0.2), and the thin crescent Moon. This will not be an easy observation. They will be very low in the twilight.

On Wednesday, November 8, you can see a transit of Mercury. (I know I'm supposed to be doing October here, but this is such a rare event, I want you to be able to plan ahead.) In Prescott it starts at 12:12:29 PM and ends at 5:09:28 PM. Sunset is 5:30 PM. You will want at least a small (3 inch) telescope with a solar filter over the objective to observe this event.

Pluto: Planet or Not?

(Continued from page 3)

and the other eight planets are like the long dresses. They are performing their own orbital dance around our star at their "Neighborhood Block Party".

Seriously, the above analogy can be quite useful for the classification of planets in our celestial neighborhood. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto are still planets, even if all of them are so different from one another in terms of size, composition, orbital path, and distance from the Sun. What is so common is that all of them are round objects orbiting the Sun, a star member of our solar system. Even if all of the women attending the formal event with their spouses are wearing dresses of varying styles, fabrics, and lengths, all of their outfits are still dresses. Does this make any sense to any one of you?

My Opinion:

I grew up knowing Pluto to be one of the 9 planets in our solar system because I was educated about our celestial neighborhood so many years ago. For the life of me, I cannot imagine Pluto being other than one of the planets orbiting the Sun. It is quite ridiculous for the little Pluto to be stripped of its planet status. It is almost like taking gold medals away from a true Olympic champion who has never taken performance-enhancing drugs or cheated during competition.

For the sake of history, as well as future exploration, Pluto should remain as the 9th planet in our solar system. It would not hurt for Xena and other discoveries to be added as planets to our celestial backyard.

By the way, we are still a part of history in the making. Galileo Galilei discovered the four moons of Jupiter in the 1600's called the Galilean satellites, and Giovanni Cassini discovered a huge gap in Saturn's magnificient rings called the Cassini Division. Clyde Tombaugh discovered the little planet almost 80 years ago. Because of advanced technologies, especially with larger and more powerful telescopes, more objects similar to Pluto or larger are being discovered. Wouldn't it be neat if many of us get the chance to witness the most significant discoveries or breakthroughs in our lifetimes?

FYI, the outcome of the Pluto debate (i.e., exact definition and Pluto's planet status) will be announced at the end of the convention. By the time this is published, the outcome would have been known. Hopefully, Pluto will still be one of the planetary objects in our vast celestial neighborhood!

Laurice Dee, Ph.D.

JPL Solar System Ambassador (Arizona Representative)

JPL Solar System Ambassadors Program

Jet Propulsion Laboratory (JPL) - Pasadena, CA

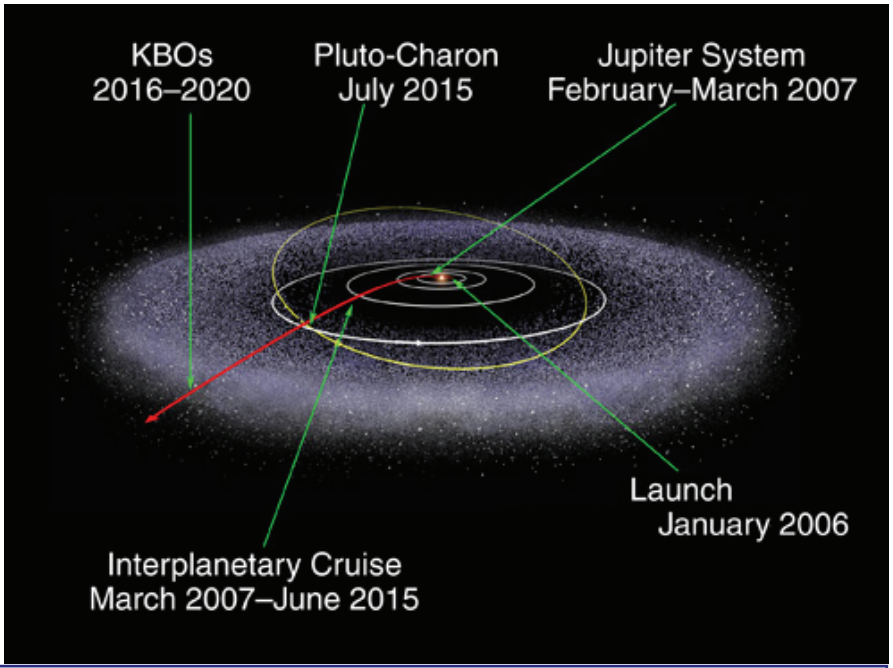
If you have any questions and would like to comment, please do contact Dr. Dee at jplssambassador@wyndtell.com or launchspace@msn.com or send her a fax at 480.890.7878. The website for the JPL Solar System Ambassadors Program is http://www.jpl.nasa.gov/ambassador.

New Horizons launched on January 19, 2006 from Cape Canaveral.

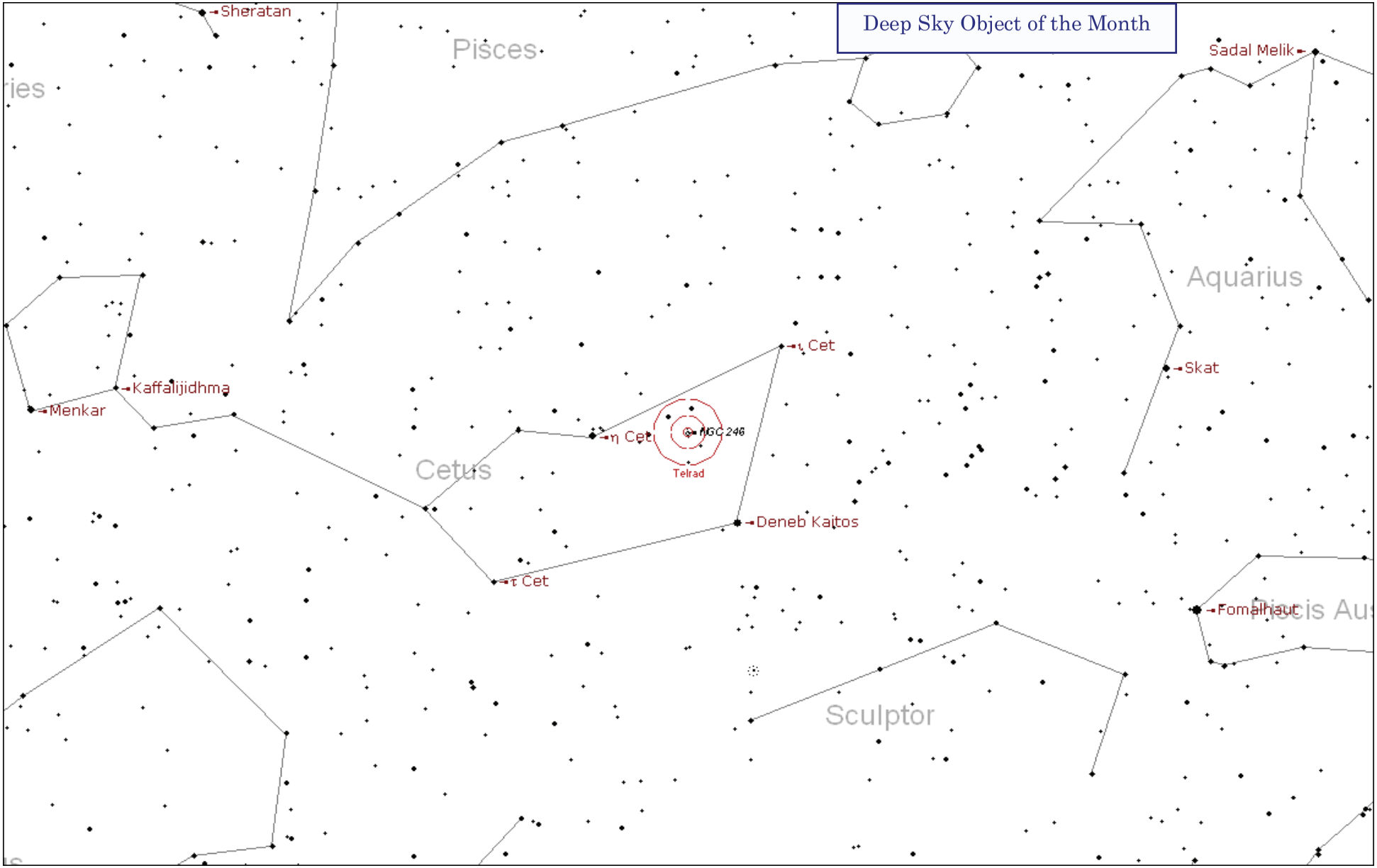
The first 13 months include spacecraft and instrument checkouts, instrument calibrations, trajectory correction maneuvers, and rehearsals for the Jupiter encounter. Closest approach to Jupiter will occur Feb. 28, 2007. Moving about 47,000 miles per hour (about 21 kilometers per second), New Horizons would fly 3 to 4 times closer to Jupiter than the Cassini spacecraft, coming within 32 Jupiter radii of the large planet. Planned activities during the approximately 8-year cruise to Pluto include annual spacecraft and instrument checkouts, trajectory corrections, instrument calibrations and Pluto encounter rehearsals.

Close approach to Pluto: July 14, 2015

Current 1st graders will see New Horizons arrive at Pluto during the summer before 11th grade!



Deep Sky Object of the Month



NGC 246 Planetary Nebula in Cetus

Magnitude: 8.0 Size: 4.1’ Magnitude of Central Star: 11.9

RA 00h 47m 03.6s Dec -11° 52’ 20”

Chart created with Starry Night Pro software.

Messenger and New Horizons

(Continued from page 5)

New Horizons was launched this past January and will be traveling in space for the next 9 years until it reaches Pluto in July 2015. After that, it will voyage into the Kuiper Belt between the years 2016 and 2020. During the journey to the most distant planet in our solar system, the spacecraft will fly past Jupiter to receive gravitational boost so that it would be in a good position to get to Pluto. Instrument calibrations and scientific studies will be conducted during the Jupiter flyby. In the meantime, New Horizons has been undergoing instrument checkouts and performing trajectory correction maneuvers from time to time during the long trip to Pluto and the Kuiper Belt.

Exciting Milestone (so far) for MESSENGER

MESSENGER flew past Earth a year after it launched, and the flyby turned out to be quite successful. The flyby allowed the spacecraft to experience directional and speed changes so that it can travel toward the inner solar system. Flying past Earth set MESSENGER up for the upcoming Venus flyby which will be this October. Stay tuned for the exciting event!

Comments

New Horizons will be the first spacecraft to explore Pluto and the Kuiper Belt. Pluto is the only planet in our solar system that has never been investigated. New Horizons taking close-up images of Pluto and analyzing its atmosphere will enable scientists to understand how the icy bodies of the Kuiper Belt came to be. The current health status of the spacecraft, according to the website, is excellent.

I truly hope that Pluto will still be a planet when the New Horizons spacecraft reaches the most distant planet in our solar system!

(Please see my other write-up in the newsletter regarding the Pluto debate.)

MESSENGER will be the first spacecraft to orbit Mercury, although the planet had been investigated by a few flyby spacecraft in the past. The spacecraft will be able to map the entire surface of Mercury and take in-depth measurements of its surface and magnetic field. Like New Horizons, the MESSENGER spacecraft is in excellent health.

Most spacecraft that traveled to the outer solar system planets (Mars, Jupiter, and Saturn) were able to get into orbit successfully after performing their orbit insertion burns that allowed the planets' gravity to capture them into orbit. Since we had only one spacecraft fly into the inner solar system to orbit a planet (the Magellan mission to Venus), MESSENGER will be the second spacecraft to attempt to orbit an inner solar system planet after reaching Mercury in 2011. Lets wish the mission team the best of luck in getting MESSENGER to the little pockmarked planet for a successful mission!

Laurice Dee, Ph.D.

JPL Solar System Ambassador (Arizona Representative)

JPL Solar System Ambassadors Program

Jet Propulsion Laboratory (JPL) - Pasadena, CA

If you have any questions and would like to comment, please do contact Dr. Dee at jplssambassador@wyndtell.com or launchspace@msn.com or send her a fax at 480.890.7878. The website for the JPL Solar System Ambassadors Program is http://www.jpl.nasa.gov/ambassador

Coming in November… our guest speaker will be ASU professor Dr. Ronald Greely, who will give a presentation entitled "Exploration of Mars from Orbit."

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.

AGN and Multi-Wavelength Astronomy

(Continued from page 14)

other things with their spectra such as estimate total output and generally classify the AGN population. Understanding the relations in all the different variability's, (many seemingly random) we have seen in the SED of AGN is also important for a better understanding of what is occurring.

There are still many questions unanswered about AGN, and the AGN model itself is still not completely well defined, (for example, starburst and super wind components with their model), [1]. We still are finding out new relationships between the red shift and certain spectral features of AGN and the red shift data also needs to be made more accurate.

In the science of AGN, if the models fit the individual and unique spectra of the AGN under study, then we have made definite progress.

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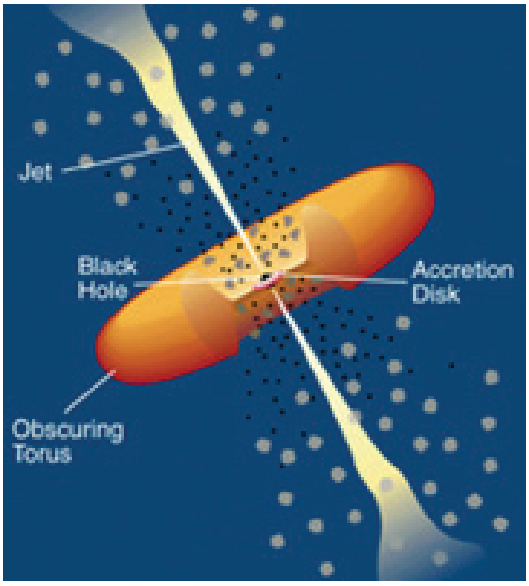

The first image is a Hubble Heritage image of M87, while the second one is a schematic diagram of an AGN

Galaxies are groupings of a large number of stars (roughly a million or so), with some dust and gas thrown in, held together by their mutual gravity. A special class of galaxies, know as Active Galaxies have centers (or nuclei) that are the source of tremendous energy, shining with power equivalent to trillions of suns. It is believed that at the center of these objects there lies a supermassive black hole, which ejects jets of matter in opposite directions at nearly the speed of light. An accretion disk around the black hole lies in a plane perpendicular to the jets (as shown in diagram below). In addition, surrounding the accretion disk is a torus (donut) of molecular material, which can obscure observations of the black hole and accretion disk if viewed through the donut.

Active Galactic Nuclei (AGNs) represent the largest identified class of high-energy gamma-ray sources and are generally only detected as gamma-ray sources when one of the jets is directed toward us. In this orientation the AGN is referred to as a Blazar. This is also the orientation in which the torus and material accreting around the black hole at the center does not actually obscure the black hole or the inner part of the jet. Think of looking at a donut from the side and the top, where the donut itself represents the material around the black hole and the donut hole is the black hole.

Images courtesy of NASA

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!

East Valley Astronomy Club

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