January 2007

The Observer

East Valley Astronomy Club

Volume 21 Issue 1

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January Events:

- *Public Star Party in Gilbert - January 12*
- *Local Star Party at Boyce Thompson - January 13*
- *January Meeting at Southeast Regional Library - January 19*
- *Deep Sky Star Party at Vekol Road - January 20*

From the Desk of the President

by Claude Haynes 2007 EVAC President

A monthly column - I'll have to get use to writing on a regular basis (something my mother accused me of not doing enough). I don't have words of wisdom; only gratitude and hope. Special thanks to Tom and Jennifer Polakis for hosting our Holiday Party. It was nice to have the Space Shuttle and ISS crew stop by. And extra special thanks to Steven Aggas, Silvio Jaconelli, Tom Polakis and John Holmquist for their service during the past year. The back page lists the 2007 Officers and Board Members, some continuing and others in new positions. I look forward to working with them to continue the programs and outreach of EVAC. I believe it will be an exciting year for the club. We have already had over 2,500 visitors to the Observatory on Friday and Saturday nights, our membership remains constant, and our school star parties are pointing another generation to look up to the heavens. It should be a fun year, and I am honored by the opportunity to serve as EVAC President.

The Backyard Astronomer

Lesser Known Winter Objects, Part Two *by Bill Dellinges*

Last month we looked at six winter objects a bit off the beaten celestial path. Let's take a look at six more as Earth approaches aphelion in January. Ironically, though we are closest to the Sun January 3rd. Earth's 23 ½ degree tilt away from the Sun at this time of the year results in sunrays hitting the northern hemisphere in a more slanting angle causing cooler temperatures. Thus we find our hands frozen to our telescopes.

Orion's Belt: The king of constellations is loaded with deep sky objects and double stars. The Belt stars, Alnitak (Zeta Orionis), Alnilam (Epsilon Orionis), and Mintaka (Delta Orionis) are three of the most distinctive stars in the night sky. Many gazers ignore this area and make a beeline for M42, the Orion Nebula, in the Sword below. But if you have a short focal ratio scope that can gobble up 3 degrees, you'll be pleasantly surprised at the rich star field awaiting you there. Better yet, attack the region with binoculars, for there is no such thing as too big a field here! My 8x50's 7 degree field can gather in

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The Backyard Astronomer

(Continued from page 1)

not only this rich star field, but also the entire Sword – a sight to behold. But force yourself away from the Sword and glorious M42 and return north to the belt. There are about 100 stars here, mostly sprinkled around the belt's middle star, Alnilam. Notice the splash of stars also runs west of the belt and then north – this is where a wide field really comes in handy. It's busy here because the Milky Way intrudes somewhat into Orion. The more aperture you use here, the more stars you'll see. When I zeroed in on Alnilam with my 20x80 binoculars, I was astounded by how many more stars they pulled in (though at a cost in field, of course). Not usually labeled in star charts, this area is variously known as Collinder 70, Lund 186, MRK 13, and the Great Orion Association.

NGC 2169 (Orion): RA 06h 08.4m DEC +13° 58'. The so-called "37" cluster is located at the "elbow" of Orion's right arm just below a line connecting Xi and Nu Orionis. Normally this small loose cluster wouldn't call attention to itself, but it's unique in that it forms a cute little number "37." For those with scopes with diagonals reversing the field, well, flip it around in your mind. While viewing it recently, I was surprised to see there was a double star I had never noticed before on top of the "3", just barely split at 70x. Separation was more convincing in my 11" at 127x. This is Σ (Struve) 848. AB Mag 8.3, 9.0, Sep 2.5" PA 108°. Stephen O'Meara calls it the "Shopping cart" cluster. Check it out, what does it look like to you, a 37 or a shopping cart?

Beta Monocerotis (Monoceros): RA 06h 28m 49s DEC -7° 02'. (ADS 5107, SAO 133316, Σ 919). My favorite triple star. AB 4.6, 5.0 SEP 7.2" PA 132°, AC 4.6, 5.3 SEP 9.9 PA 106°. A beautiful short curved string of three white stars of gradually diminishing magnitude. Fairly tight and bright yet easily split in fair seeing at moderate power. The 11" split AB at 70x. 127x barely splits BC. 165x resolves all three components nicely. A must for any gazer interested in multiple stars.

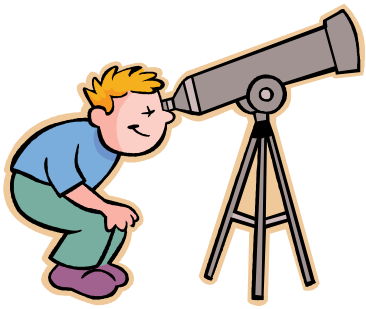
NGC 2362 (Canis Major): RA 07h 18.8m DEC -24° 57'. A cute open cluster in eastern Canis Major. Follow a line from Sigma and Delta Canis Majoris an equal distance to Tau (30) Canis Majoris and you're there - on top of it actually - as 4.3 magnitude 30 Tau sits directly in the middle of the cluster. The 11" at 70x shows a small sparse triangular shaped group of 25 stars. At 104x, about 60 stars comprise this little jewel box with the dominating yellow Tau accenting the grouping.

Bonus object nearby! Attention double star lovers. Two degrees NNW of NGC 2362 is the "Winter Albireo" (h 3945, ADS 5951, SAO 173349). Slide your scope up to this little gem, a yellow and blue double just a little dimmer and tighter than Albireo. Defocus your telescope a tad to bring out its colors. AB MAG 5.0, 6.0 SEP 26.8" PA 55°.

NGC 7789 (Cassiopeia): RA 23h 57m, DEC +56° 44'. A magnificent overlooked open cluster lying between Sigma and Rho Cassiopeiae (a short hop from Beta).This is an amazingly beautiful, large (30') assemblage of 600 faint stars of roughly equal magnitude. I was left breathless by my first view of it years ago in my C14 at 98x. The ½ degree field was filled with powdery stars. A recent view in my 11" was less impressive, but I think high thin clouds were the culprit. Check it out and see what you think!

Addendum: These same high clouds prevented me from getting a decent view of NGC 2403 in Camelopardalis for this article. I have reason to believe this galaxy is of special interest as it's bigger and brighter than NGC 2903 in Leo, another galaxy in the same league – a "missed" Messier object. Look for it at RA 07h 37m +65° 36'. It will be on the meridian in early January.

The dozen objects described in part one and two of this article never fail to excite me when viewing them each winter. I hope you may experience the same rush when you turn your telescope on them for what may be the first time.



● Full Moon on January 3 at 06:58

◑ Last Quarter Moon on January 11 at 05:45

○ New Moon on January 18 at 21:01

◐ First Quarter Moon on January 25 at 16:02

2007: A Year of Sky Events
by Joe Orman

Mark your calendar for these interesting alignments, conjunctions, occultations & meteor showers in the year 2007. Times are calculated for Phoenix, Arizona; other locations may differ. Most will be easy to see with the unaided eye, some very challenging -- take a look! Constructive comments and corrections welcome. This list may be copied and distributed for non-commercial use, but it must be credited to Joe Orman.

Photo Pages: *joeorman.shutterace.com*

January 2-3 (night): Major lunar standstill: full Moon passes nearly overhead, only 6 degrees away from zenith at about 12:15 a.m.

January 15 (morning): Bright star Antares 1 degree to upper left of crescent Moon as they rise in SE about 4:30 a.m. (occultation for southern South America), Jupiter 5 degrees to upper left.

January 20 (evening): Venus 3 degrees to lower right of crescent Moon, low in WSW after sunset (occultation for southern Africa).

February 7 (evening): Mercury at Greatest Elongation, visible for about a week around this date above twilight, low in WSW after sunset. Venus 7 degrees to upper left.

February 19 (evening): Venus 5 degrees below crescent Moon, in W after sunset.

February 23 (evening): First-quarter Moon 2 degrees from Pleiades star cluster, near zenith after sunset (occultation for northeast North America, northwest Europe).

March 15 (morning): Mars 7 degrees to left of crescent Moon, low in SE before sunrise. Mercury 15 degrees to lower left of Mars. Moon between Mars and Mercury on March 16.

March 20: Spring equinox (5:07 p.m. MST). Sunrise straight east (6:32 a.m., azimuth 89.6 degrees), sunset straight west (6:40 p.m., azimuth 270.6 degrees). Always use proper eye protection when viewing the sun.

March 20 (evening): Venus 7 degrees to upper left of crescent Moon, in W after sunset.

March 22 (evening): Pleiades star cluster 3 degrees below crescent Moon high in W after sunset, within 0.5 degrees as they set in WNW about 11:30 p.m. (occultation for northeast North America, northwest Europe).

March 28 (evening): Saturn 0.5 degree from gibbous Moon, very high in ESE after sunset (occultation for Greenland & Iceland).

April 14 (morning): Mars 7 degrees to upper right of crescent Moon, low in ESE before sunrise.

April 19 (evening): Crescent Moon between Venus and Pleiades star cluster, 5 degrees from each, in W after sunset (Moon occults Pleiades for northeast Europe).

April 25 (morning): Saturn 1 degree to upper left of first-quarter Moon, as they set in WNW about 2:30 a.m. (occultation for northwestern Canada and Alaska).

April 26 (morning): Gibbous Moon occults bright star Regulus (disappears behind dark edge just minutes before they set in W about 3:00 a.m. MST) (occultation more easily seen in northwestern North America).

May 19 (evening): Venus 1 degree to lower left of crescent Moon, in W after sunset.

May 22 (evening): First-quarter Moon between Saturn and bright star Regulus, 5 degrees from each, high in WSW after sunset (Moon occults Saturn for parts of Europe, Africa, Asia).

May 31 (evening): Jupiter 7 degrees straight to left of full Moon, as they rise in SE about 7:45 p.m.

June 1 (evening): Mercury at Greatest Elongation, visible for about a week around this date above twilight, low in WNW after sunset. Also follow line through Venus and Saturn higher in W, across to Jupiter low in ESE.

June 13 (morning): Very thin crescent Moon occults Pleiades star cluster, low in ENE before sunrise, Moon entering cluster as they rise about 3:30 a.m.

June 17 (evening): Crescent Moon, Venus, Saturn, and bright star Regulus in line, about 10 degrees between each, in W after sunset. Moon between Venus and Saturn on June 18.

June 19 (daytime, evening): Thick crescent Moon occults bright star Regulus, high in SW in late afternoon (disappears behind dark edge about 5:00 p.m. MST, reappears from behind bright edge about 6:25 p.m.). After sunset, Regulus 1 degree to right of Moon, high in W.

June 30 (evening): Saturn 1 degree above Venus, in W after sunset.

July 11-12 (evenings): Bright star Regulus 2 degrees above Venus, low in W after sunset. Saturn 5 degrees to lower right.

July 16 (evening): Venus and bright star Regulus 5 degrees to upper left of crescent Moon, Saturn 2 degrees to lower right of Moon, low in W after sunset.

August 6-7 (night): Pleiades, Mars and thick crescent Moon in triangle 6 degrees apart, rising in ENE around midnight (Moon occults Pleiades for western Europe).

2007: A Year of Sky Events

(Continued from page 3)

August 12-13 (night): Perseids meteor shower. New Moon will not interfere. Shower radiates from constellation Perseus, which rises in NE about 10 p.m. Best time to look between midnight and morning twilight. Typical rate 50 meteors per hour.

August 28 (morning): Total lunar eclipse, in SW before sunrise (partial phase starts 1:51 a.m. MST, totality from 2:52 a.m. to 4:22 a.m., partial phase ends 5:23 a.m., Moonset 6:10 a.m.).

September 1-3 (mornings): Saturn 1 degree from bright star Regulus, very low in ENE before sunrise.

September 2 (evening): Moon occults Pleiades star cluster, low in ENE after sunset, Moon entering cluster as they rise about 10 p.m.

September 9 (morning): Venus 10 degrees to upper right of crescent Moon, Saturn and bright star Regulus 7 degrees below Moon, low in E before sunrise.

September 21 (evening): Bright star Spica 0.5 degree to left of Mercury, extremely low in W after sunset.

September 23: Fall equinox (2:51 a.m. MST). Sunrise straight east (6:17 a.m., azimuth 89.5 degrees), sunset straight west (6:24 p.m., azimuth 270.3 degrees. Always use proper eye protection when viewing the sun.

September 30 (morning): Pleiades star cluster 1 degree from gibbous Moon, near zenith before sunrise (occultation for parts of Asia).

October 7 (morning): Saturn 1 degree to left of crescent Moon, Venus and bright star Regulus 5 degrees to upper right, in E before sunrise.

October 14-15 (mornings): Saturn 3 degrees to upper left of Venus, bright star Regulus 5 degrees above, in E before sunrise.

November 3 (morning): Thick crescent Moon occults bright star Regulus, in E before sunrise (disappears behind bright edge about 3:38 a.m. MST, reappears from behind dark edge about 4:44 a.m.).

November 5 (morning): Venus 3 degrees to left of crescent Moon, in ESE before sunrise.

November 7 (morning): Mercury 10 degrees to lower left of thin crescent Moon, bright star Spica between them, low in ESE before sunrise.

November 17-18 (night): Leonids meteor shower. First-quarter Moon setting around midnight will not interfere. Shower radiates from constellation Leo, which rises in E about midnight. Best time to look between midnight and dawn. Typical rate 20 meteors per hour, some years much higher.

November 24 (morning): Full Moon grazes Pleiades star cluster, low in WNW before sunrise (occultation for northern North America, northern Asia).

November 26 (evening): Mars 1 degree to lower right of gibbous Moon, rising in ENE about 7:30 p.m.

December 5 (morning): Venus, crescent Moon and bright star Spica make triangle 7 degrees apart, in SE before sunrise.

December 13-14 (night): Geminids meteor shower. Crescent Moon setting about 9 p.m. will not interfere. Shower radiates from Castor in constellation Gemini, which rises in NE around 7 p.m. and is near zenith in early morning hours. Best time to look between 9 p.m. and dawn. Typical rate 60 meteors per hour.

December 21 (evening): Pleiades star cluster 2 degrees to upper right of gibbous Moon, high in E after sunset (occultation for northeast North America, northern Europe).

December 23 (evening): Mars 1 degree below full Moon as they rise in NE about 5:00 p.m. (occultation for northwestern Canada). Mars is only 1 day before opposition, so should be bright enough to see close to full Moon.

Venus-Jupiter-Moon-Spica

September 6, 2005

On this evening, 4 celestial bodies appeared with 5 degrees of each other (clockwise from upper left): the bright planets Venus and Jupiter, the crescent Moon, and the dimmer star Spica. The arrangement was photographed above the Sierra Estrella, south of Phoenix, Arizona.

Camera: Olympus OM-1 35mm SLR, on fixed tripod. Film: Fuji Provia 100 slide. Lens: 100mm at f/4, approximately 5 seconds.

April 17, 1999, Sentinel, Arizona.

People move about like ghosts, checking out their equipment while waiting for the moon to set and twilight to end. Above is the crescent moon and Venus. To the left of Venus Aldebaran and the Hyades can be faintly seen.

Camera: Olympus OM-1 35mm SLR, on fixed tripod. Film: Fuji Provia 100 slide. Lens: 50mm at f/2.8, approximately 6 seconds.

Photos by Joe Orman

January's Guest Speaker : Dr. Ted Bowell

EVAC starts off the new year by welcoming Dr Ted Bowell from Lowell Observatory in Flagstaff. Dr Bowell is principal investigator of the Lowell Observatory Near-Earth-Object Search (LONEOS). He has discovered a large number of asteroids, both as part of LONEOS and in his own right before LONEOS began. Among the latter are the Trojan asteroids 2357 Phereclos, 2759 Idomeneus, 2797 Teucer, 2920 Automedon, 3564 Talthybius, 4057 Demophon, and (4489) 1988 AK. He also co-discovered the periodic comet 140P/Bowell-Skiff, and the non-periodic comet C/1980 E1.

Dr Bowell's current research centers on the discovery and orbit computation of near-Earth asteroids and comets.

LONEOS is a system designed to find Earth-crossing asteroids (ECAs) and comets (ECCs), collectively known as near-Earth objects (NEOs). These objects can occasionally collide with Earth sometimes with devastating consequences. Finding large NEOs is the first step in averting a collision.

It is thought that there are about 1600 ECAs larger than 1 km in diameter. Only about 100 are known. To find the remainder - or most of them - will require dedicated telescopes that survey the sky for many years. Currently, only one such search telescope is in full-time operation: Spacewatch.

LONEOS, and other systems under development, will supplement the work of Spacewatch. LONEOS should have the capability to scan the entire dark sky accessible from Flagstaff, Arizona, three times per month for a magnitude limit near V=20. After 10 years of full-time operation, it is estimated that LONEOS could discover 1000 of the large NEOs and perhaps twice as many smaller ones, thus increasing our knowledge of these bodies by an order of magnitude.

Mind Where You Are Leaking

by Henry De Jonge IV

For most of the 20th century the earth has been unintentionally sending out electromagnetic signals into the universe. This has been done primarily with both light waves and radio waves. We will look at this leaking" radiation, discuss its causes, history, possible development, and how it may help us in detecting other civilizations with a similar "problem". We will also look at where these signals might be by now and if they could be detectable by other civilizations.

Electromagnetic Radiation, Leakage, and Detection

The earth is the largest source of artificial radio noise in the solar system due to its leakage, [4]. The leakage of radiation from the earth comes from many sources due to our industrial activity. These signals are comprised of both light and radio waves. They consist of electromagnetic waves of all kinds, TV transmissions, radio waves, and radar waves. These all come from many sources such as all types of light sources, personal radios and cell phones, radars of all kinds, radio stations, and TV stations.

Any such signals obviously travel at the speed of light and thus far, are our best bet for signaling the fact of our existence outside our planet, throughout the universe. Not all of this leakage is sent into space. The earth's atmosphere has "windows" of transmission so that only certain wavelengths of electromagnetic radiation are emitted with strong intensity or at all. This also allows maximal detection capability from the earth's surface.

In terms of light waves, astronomers are well familiar with "light pollution" from many sources, especially nearby cities. Though this light may be intense to our senses and instruments here on earth, (or in nearby space orbits), compared to interstellar distances it is extremely weak and would most likely not be seen or even detectable from any "nearby" stars, [1]. This is true even though light waves carry about 10^6 times more energy than radio waves, [3]. Light waves are also easily absorbed by the gas and dust in the ISM. The sun is obviously the brightest source of light, (and optical noise) in the solar system and around the earth, and would definitely tend to override most if not all of any light leakage we emit. I know myself that I have many times sent a laser beam into the heavens. Who knows if those quanta will ever be detected by any other life forms?

In terms of TV signals, below we see a map of the worldwide distribution of the approximately 2200 TV transmission stations on the earth. We have been emitting TV signals for about 50 years now. Only a small percentage of this broadcast TV is intercepted by earthly antennas, the rest escapes into space, [2]. About one third of the TV signal is focused into a small part of the spectrum, about 1Hz wide, as a carrier wave. The picture and sound are about $5x10^6$ times wider. Thus a large part of the emitted radio energy is compressed into a very small part of the spectrum and would be easier to pick out over a long distance, [5].

On the other hand, TV signals are also usually just strong enough to

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Classified Ads

Tele Vue Panoramic Alt-Az Mount

Tele Vue Panoramic ash tripod mated with a Telepod head, including the optional Telepod handle.

The ash Panoramic tripod with the Telepod head sells new for $605, and the handle adds another $50. The previous owner had drilled a couple of holes in the Telepod head for an encoder project (the holes in no way affect operation), so I'll offer a serious discount to members.

The ash tripod and the Telepod head with handle, all for only $225. But wait… there's more. I'll also include an Orion padded soft case to carry it all around in (a $55 value). That represents about a 65% discount from new.

Peter Argenziano 480-633-7479

news@eastvalleyastronomy.org

12" Meade LX-200 GPS

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

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

Package includes:
12" LX200-GPS UHTC

All Original Equipment
(including Giant Field Tripod, Manual, 26mm eyepiece, original box, etc.)
Upgrades/Extras:
Mounting Plate ($99)

Get-A-Grip handles ($130)

A new 12" LX200R is $4,694, your price is $2,700

Also for Sale:

APT Astro AMF Equatorial Wedge ($650) – Price $450.

The APT wedge is equivalent to the Mittty Evolution Wedge and will handle up to a 14" Meade RCX400

Astrovid Stellcam II ($795) – Price $500

Marty Pieczonka 480-983-0915

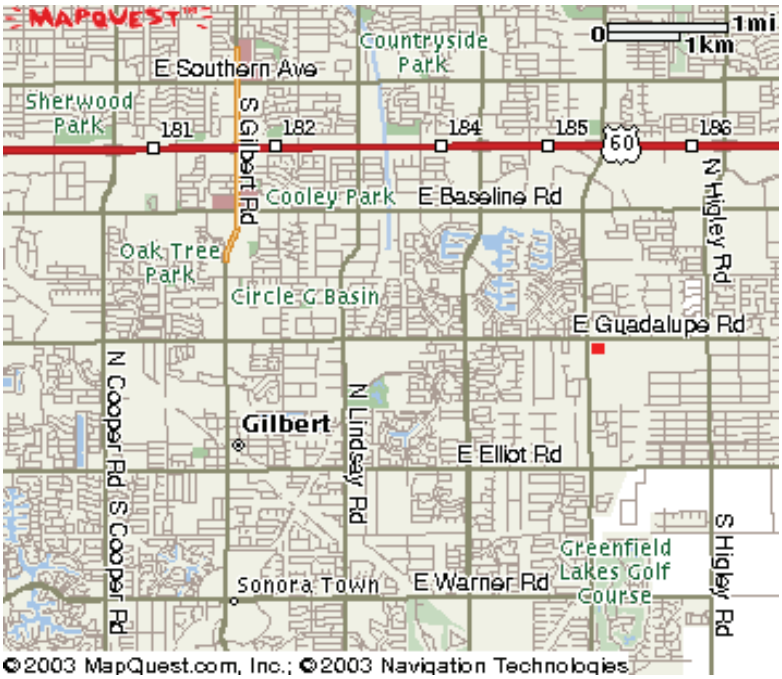
martyp@sybase.com

www.eastvalleyastronomy.org/grco/obs.asp

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

Ads should be emailed to: news@eastvalleyastronomy.org

Support your local telescope dealer!



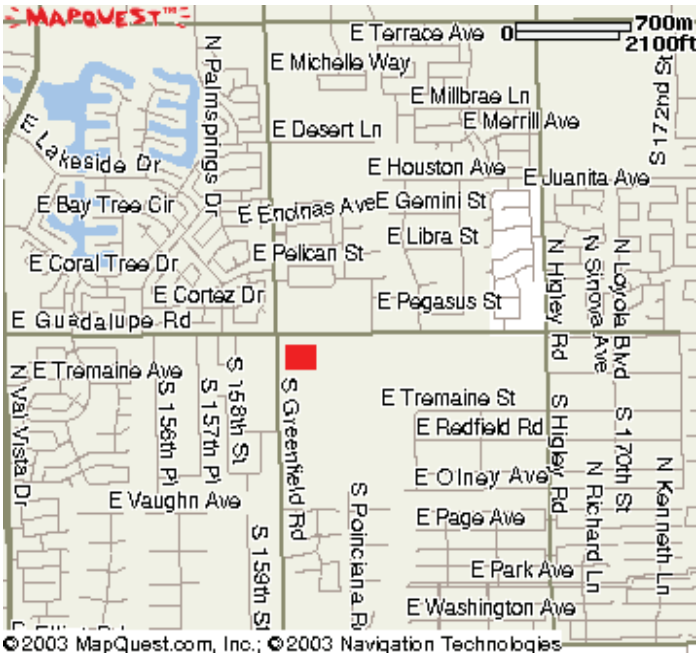
The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

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

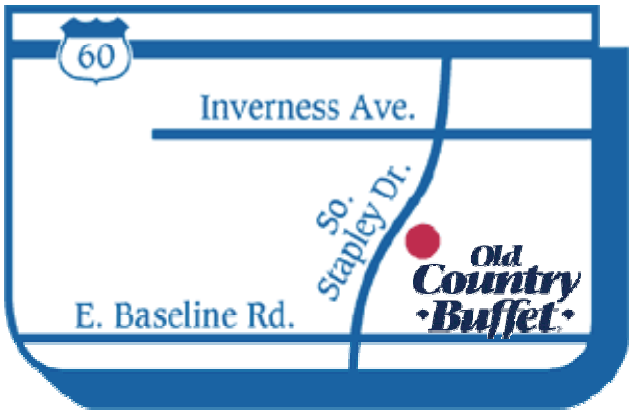
Visitors are always welcome!

2007 Meeting Dates

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



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



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

Old Country Buffet 1855 S. Stapley Drive in Mesa

January 2007

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Schedule of Events

- *January 12 - Public Star Party at Riparian Preserve in Gilbert*
- *January 13 - Local Star Party at Boyce Thompson Arboretum State Park*
- *January 19 - General Meeting at Southeast Regional Library in Gilbert*
- *January 20 - Deep Sky Star Party at Vekol Road*

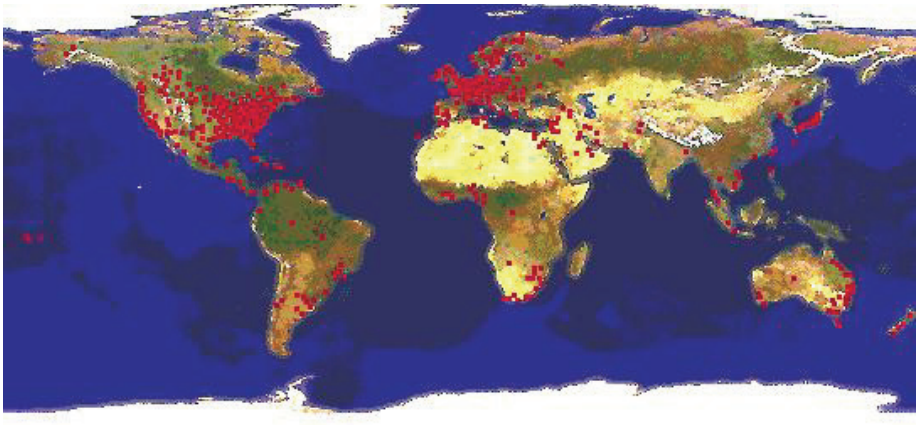
Mind Where You Are Leaking

(Continued from page 5)

cover their assigned area, (usually city to city to avoid interference) and the signals are beamed towards the horizon with a vertical width of about 10-15 degrees, and power from 20-50 kW, although some emission is radiated in all directions, [6]. As the earth rotates, the signals sweep through space. So TV signals have both good and bad points for extraterrestrial detection.

In another vein of thought we now see more and more cable TV, fiber optic TV, and satellite TV, which do not normally cause a lot of leakage into space. Perhaps we have already sent into space our maximum TV signal, (timeframe) for others to detect, [7]?

Radio waves offer us a better chance of being detected by others in the universe. We have been emitting radio signals for about 100 years now. The sun is a relatively weak source of radio waves and radio waves can penetrate further out into space through gas and dust, [1]. There are two main forms of radio interference to contend with, the galactic noise,



(mainly from synchrotron radiation caused by spiraling electrons in magnetic fields) and the 3 degree K, cosmic microwave background radiation, [3]. Compared to optical waves, the universe is relatively quiet in the radio region. If we also look at the radio transmission windows in the earth's atmosphere, we see that the best frequencies emitted are from a few MHz, (about 10MHz) to a few thousand MHz, (about 10 GHz). This range is also the best range to detect outside radio waves from the earth's surface. While we all learned in school that AM radio reflects off the ionosphere, most of the VHF, UHF, and microwave band can escape into space, [6].

Radar and especially the more powerful military radars also allow energy to escape into space.

Radars and satellite communication are usually in the ultra high frequency, millimeter wave bands and besides being very directional, are more powerful than most other radio sources, [1]. We have also used highly directional radars to map other planets and to tightly define their orbits as well as

East Valley Astronomy Club -- 2007 Membership Form

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

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

Select one of the following:

☐ New Member ☐ Renewal ☐ Change of Address

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

☐ **$30.00 Individual** January through March

☐ **$35.00 Family** January through March

☐ **$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*

_____

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Space Weather for Air Travelers

by Dr. Tony Phillips

At a time when much of the airline industry is struggling, one type of air travel is doing remarkably well: polar flights. In 1999, United Airlines made just twelve trips over the Arctic. By 2005, the number of flights had grown to 1,402. Other airlines report similar growth.

The reason for the increase is commerce. Business is booming along Asia's Pacific Rim, and business travel is booming with it. On our spherical Earth, the shortest distance from Chicago to Beijing or New York to Tokyo is over the North Pole. Suddenly, business travelers are spending a lot of time in the Arctic.

With these new routes, however, comes a new concern: space weather.

"Solar storms have a big effect on polar regions of our planet," explains Steve Hill of NOAA's Space Weather Prediction Center in Boulder, Colorado. Everyone knows about the Northern Lights, but there's more to it than that: "When airplanes fly over the poles during solar storms, they can experience radio blackouts, navigation errors and computer reboots—all caused by space radiation."

In 2005, United Airlines reported dozens of flights diverted from polar routes by nasty space weather. Delays ranged from 8 minutes to nearly 4 hours, and each unplanned detour burned expensive fuel. Money isn't the only concern: Pilots and flight attendants who fly too often over the poles could absorb more radiation than is healthy. "This is an area of active research—figuring out how much exposure is safe for flight crews," says Hill. "Clearly, less is better."

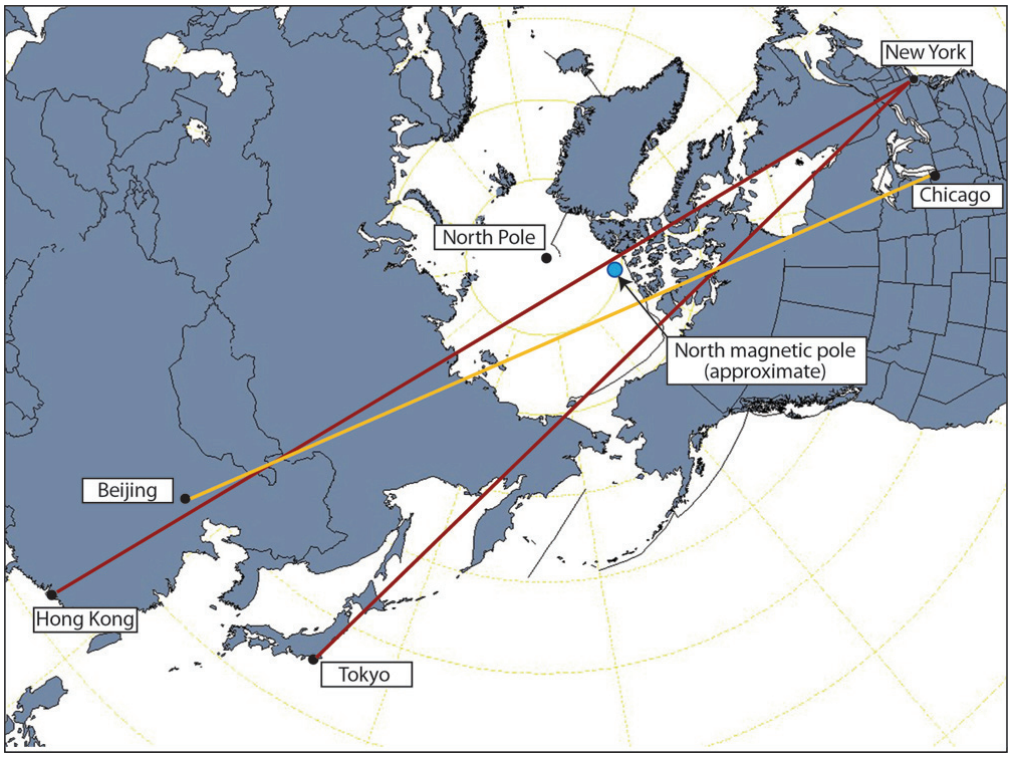
To help airlines avoid bad space weather, NOAA has begun equipping its GOES weather satellites with improved instruments to monitor the Sun. Recent additions to the fleet, GOES 12 and 13, carry X-ray telescopes that take spectacular pictures of sunspots, solar flares, and coronal holes spewing streams of solar wind in our direction. Other GOES sensors detect solar protons swarming around our planet, raising alarms when radiation levels become dangerous.

"Our next-generation satellite will be even better," says Hill. Slated for launch in 2014, GOES-R will be able to photograph the Sun through several different X-ray and ultra-violet filters. Each filter reveals a somewhat different layer of the Sun's explosive atmosphere—a boon to forecasters. Also, advanced sensors will alert ground controllers to a variety of dangerous particles near Earth, including solar protons, heavy ions and galactic cosmic rays.

"GOES-R should substantially improve our space weather forecasts," says Hill. That means friendlier skies on your future trips to Tokyo.

For the latest space weather report, visit the website of the Space Weather Prediction Center at http://www.sec.noaa.gov/ . For more about the GOES-R series spacecraft, see http://goespoes.gsfc.nasa.gov/goes/spacecraft/r_spacecraft.html . For help in explaining geostationary orbits to kids—or anyone else—visit The Space Place at http://spaceplace.nasa.gov/en/kids/goes/goes_poes_orbits.shtml .

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



The shortest airline routes from the Eastern U.S. to popular destinations in Asia go very near the magnetic North Pole, where space weather is of greatest concern.

If it's Clear...
by Fulton Wright, Jr.
Prescott Astronomy Club

January 2007

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

On Wednesday, January 3, at 5:43 PM (12 minutes after sunset) the full moon rises, so forget the faint fuzzies tonight.

On Wednesday, January 10, about 7:00 PM, you can see Algol at its minimum. This eclipsing binary variable star is usually at magnitude 2.1 (about the same as gamma Andromedae in the constellation next door, check it out the night before or after), but tonight is will be magnitude 3.4 (about the same as Rho Persius, 2 degrees south). It will be near minimum value for around an hour then slowly brighten.

On Thursday, January 18, it is new moon so you can look for faint fuzzies all night.

On Thursday, January 18, in the early evening, you will be presented with a severe observing challenge. The brightest planet (Venus, mag -4) and the dimmest (Neptune, mag 8) will be only 1.3 degrees apart but very low in the west southwest. Neptune is to the right and very slightly higher. Here are some times for planning your attack.

5:45 PM Sun sets

6:12 PM Civil twilight ends (a few stars out)

6:43 PM Nautical twilight ends (lots of stars out)

7:13 PM Astronomical twilight ends (really dark)

7:19 PM Venus sets

7:21 PM Neptune sets

From Friday, January 26 through Monday, January 29, in the evening, you can see the southern part of the Moon at its best. Libration tips that part toward us.

The Double Cluster

Both clusters are only a few hundred light-years apart, at a distance of over 7,000 light-years. See chart on page 14.

NGC 869 and NGC 884 - The Double Cluster

Perseus

November 25, 2006

Takahashi Epsilon 210 Astrograph F/3

SBIG STL11000M Camera

30R 20G 30B

Photograph reprinted courtesy of Jon Christensen

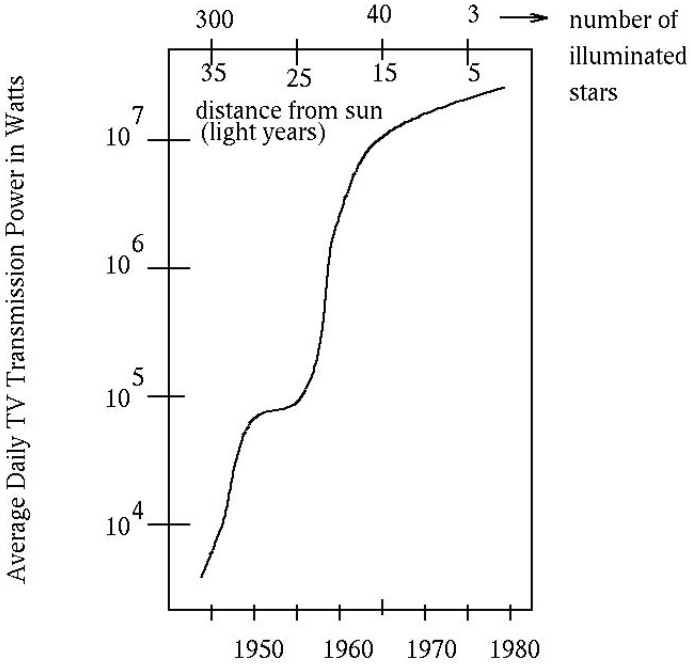
to communicate with some of our far-flung space missions.

Thus we see that the mass produced, long reaching, radio waves and the high powered, directional, radar waves are the most likely leakage to be noticed by other solar systems.

Discussion

Where have some of our significant signals reached by now? The signals travel at the speed of light, and we can make an educated guess by comparing the time since the signals were generated and the distances of the surrounding stars from the earth.

By now our electromagnetic signature has reached well over 1000 nearby stars. From the diagram below, (a bit outdated and therefore even more stars would be in range today) we can see the approximate number of stars our electromagnetic signals have reached and also how the power levels of our TV signals have gradually increased over the years, [2]. Basically stars within 20 parsecs of the earth have a chance to detect our leakage, [3]. This is less than 1% of the volume of our galaxy, [9].



For example, it takes about 35 years for our leakage to reach 70 Virginis and 47 Ursa Majoris, two stars thought to be harboring planets, [9].

In order to be detected by another civilization we also need to bear in mind that the power of radio waves decreases with the square of the distance and that the number of frequencies emitted, (and therefore open to detection) is theoretically infinite. Therefore it is unlikely that the majority of our leaked signals would be detectable over a long, long, (interstellar distances in light years) ranges to begin with. Signals must have a minimum strength, (above a noise level) to be detected and most radio transmissions from the earth would not be detectable with our current technology at the distance of the nearest star, [7].

The whole premise of SETI is based upon the idea of detecting such electromagnetic signals, directed or leaked, from another civilization. One of the best ideas for the earth detecting leakage from other planets is the One Square Kilometer Array, (SKA). It is the first instrument that approaches the capability needed for such a purpose. It is only capable of detecting such leakage from nearby systems though. To detect leakage from tens to hundreds of light years away would require a detector, (based upon current technology) tens to hundreds of times the effective diameter, [4]. Thus we see that a very large detector would be required to detect leakage from another star system with an output similar to our own, and that it would only be possible at relatively short distances, (again based upon our current technology). Putting a detector in space orbit would obviously offer a much larger gain in our detection capability. Of course once we detect such a leaked signal we need to decide what it represents. Generally, natural signals have a broader frequency spectrum compared to artificial signals, [5], thus offering us a chance for discrimination, (what about masers and pulsars we have noticed?). Another detector that might be able to detect leakage from other planets is the 1000-foot diameter radio telescope at Arecibo, Puerto Rico, [8].

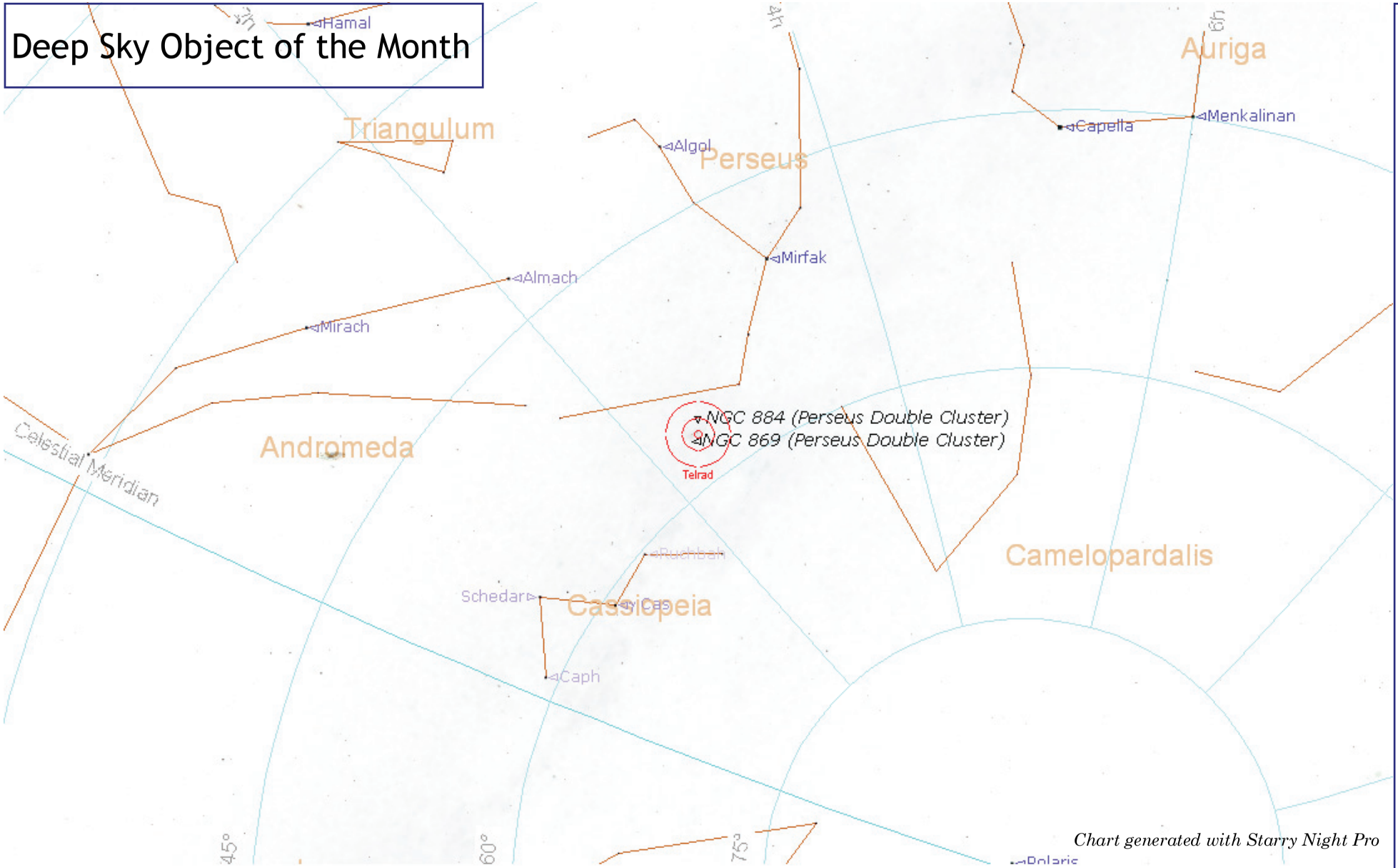
Detecting this leakage, (or directed energy) from other planets may not be so far fetched, as we have now detected many other planets, (over 200 currently as of 2006) to date, [9]. Still no signals of any type, from another civilization, have been detected to date.

Conclusion

We see that over the years the earth has emitted, (leaked) a variety of electromagnetic radiation into space. This sphere of leakage is about 100 light years in diameter and expanding at the speed of light. This emission has been largely undirected and may appear as more noise than purposeful signal to another star system, [2]. If another civilization had the proper receiving equipment and were able to receive our spectral signature they could conceivably derive information about our planet and civilization. For example, due to the rotation of the earth and its non-uniform distribution of sources, another civilization may be able to detect some sort of cyclical variation in the intensity or frequency distribution of our leaked signals, [3]. It is likely that these leaked signals would only be detectable for a relatively short range, (at most tens of light years) based upon our current technology, [1].

We also now see trends towards cable TV, directed, (to earth) satellite TV, fiber optic systems, and more and more, low power devices of all sorts, so that perhaps the general level of leakage from the earth may grow smaller in the future. Perhaps our

Deep Sky Object of the Month



NGC 869 and NGC 884 (Double Cluster) Open Clusters in Perseus

NGC 869 RA 02h 19m 04.0s Dec +57° 08' 06" Magnitude: 5.3 Size: 29' 200 stars

NGC 884 RA 02h 22m 20.0s Dec +57° 08' 00" Magnitude: 6.1 Size: 29' 150 stars

Mind Where You Are Leaking

(Continued from page 13)

use of directed energy, (and leakage) will increase thru the use of more scientific applications and a growing military technology? In my opinion this overall leakage from earth may be a temporal, passing, direct correlation, to our evolving civilization in general, like other "waste" products we have made and that have evolved over time.

Likewise it may be possible, (and is certainly feasible for us to consider) to eventually, through time and/or technology, be able to catch the same sort of leakage from another civilization. It is most likely though that directed, purposeful, signals, (leakage or deliberate) will probably stand the best chance of being detected and verified. Just as we are attempting to detect both leakage and directed radiation from other civilizations, it makes reasonable sense that they would be doing the same. The more time that goes by only increases the chances that we will be detected or detect another civilization through leakage, [9]. After all, some civilizations may have been leaking or purposely signaling for many more years than earth. We do have to be careful about assuming too much or making bold conclusions based upon our own civilization or technology.

We may detect other signs of life in the galaxy by unintentional leakage before we can pinpoint a directed, deliberate, source. At least that is how we are primarily so far, letting others know we exist outside the earth. One can only speculate any reaction, if they happen to catch a TV show or commercial!

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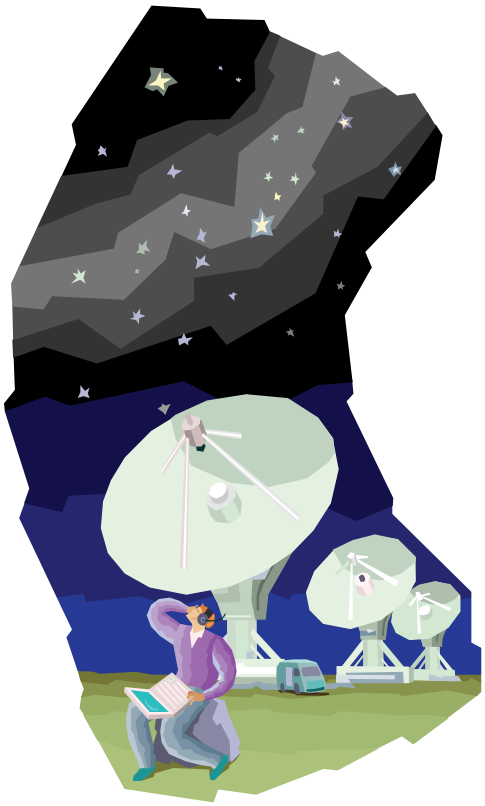

Coming in February… our guest speaker will be noted EVAC astrophotographer Jon Christensen.

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 Observer 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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