February 2010

Volume 24 Issue 2

The Observer

East Valley Astronomy Club

From the Desk of the President
by David Douglass

As we close out the books for January 2010, we have a total 124 paid up members in our group. Our dues structure runs from Jan 1st through Dec 31st. Thus, everyone's dues became due and payable on January 1st. I would like to thank the group of 124 who have now renewed their memberships by paying their dues. The process of getting everyone motivated and paying their dues is a great challenge every year.

This year, we tried something new, and sent out electronic reminders via emails messages. Hopefully, that helped. There are still 85 members who have not renewed. Hopefully, most of them will pay their dues during the month of February, and we can return our focus to astronomical issues. After all, that is really what we are about.

Our school outreach program, providing star parties for elementary and middle schools, has entered a very busy season. The weather recently has been a problem, forcing cancellation of a few of them, but many still are scheduled, and are taking place. Our events coordinator, Randy Peterson, as well as myself, really appreciate the efforts of our member volunteers that make these programs such a success. Please check the Calendar of Events on the EVAC website, and if you can help at any of these events, give Randy an email, and volunteer.

Howard Isreal will conduct the 4th of four parts in his lecture series on Basic Astronomy at the February meeting on February 19th. This series of lectures has been very popular, and well attended. Congratulations to Howard on a very successful presentation. The EVAC officers and board will be discussing options on what to do next with our pre-meeting hour, and hope-

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The Backyard Astronomer
Exploring Monoceros (part one) *by Bill Dellinges*

Monoceros, the Unicorn, is one of the most difficult constellations to find. Its brightest star is Alpha Monocerotis, only a magnitude 3.96. Things go downhill from there! Mononceros is one of the modern constellations. It first appeared on a celestial globe made by Petrus Planicus, a Dutch theologian and cartographer, in 1613. Being relatively new, there is no mythology associated with the constellation. Being faint, it has no stars with names, only the standard Bayer Greek letter designations. The unicorn is a mythological creature with a fabled history going back to antiquity. It's said the creature resembles a horse with a single long horn protruding from its head. But its feet are cloven and it possesses a lion's tail and a goat's beard. If Big Foot or the Abominable Snowman ever turn up, we might want to take another look at the possibility of a Unicorn roaming the woods.

In part one of our exploration, we shall concentrate on the head of the beast, where a wealth of interesting objects can be found in a rather small area. To find this region, start at the feet of Pollux, one of the twins of Gemini (Yes, I'm challenging you to learn a constellation. There is more to life than pushing a GoTo button). Pollux represents his head and Gamma Geminorum (2nd magnitude Althena) is his foot. Note off the foot, south a short distance, is Xi Geminorum (3rd mag.). To the southwest of Xi Geminorum you will see three 4.5 magnitude stars in a line pointing southwest towards Orion. A dark sky and eyes like a cat will help. It's

Continued on page 2

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Upcoming Events:

Local Star Party – February 6

Public Star Party – February 12

Deep Sky Star Party – February 13

Monthly General Meeting – February 19

Check out all of the upcoming club events in the Calendars on page 8

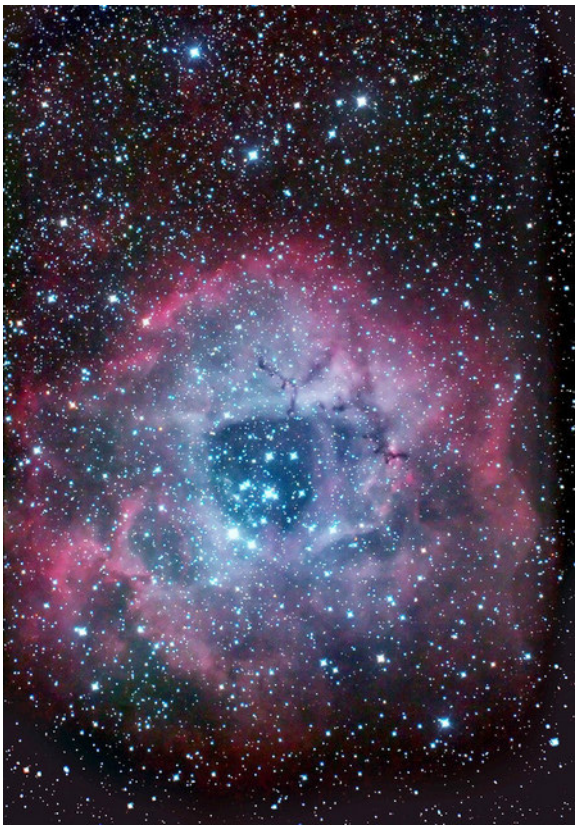
The Backyard Astronomer

Continued from page 1 crucial to recognize these stars representing the Unicorn's head because all the objects discussed below will be very close to them. These stars are so faint, they don't have Greek letter designations but do have Flamsteed Numbers. From north to south, they are 15, 13, and 8 Monocerotis. By the way, it's good to add 17 Monoceros, just east of 13, to form a long slanted "V" mimicking the long narrow shape of a horse's head.

Fifteen Monocerotis is the brightest star in the Christmas Tree Cluster, NGC 2264. The Tree is upside down, thus 15 Mon. is the base of the Tree. I can get the entire cluster in the 0.9 degree field of my 11" SCT using a 31mm Nagler eyepiece (90x). This is a large, bright cluster! Too bad it's upside down. NGC 2264 also alludes to the associated emission nebula intertwined with the cluster. I could see hints of it around 15 Mon. and some other bright stars on the Tree's west side. Just south of the tip of the tree is the famous Cone Nebula (also NGC 2264). I could not pick it out. It's primarily a photographic object though some report seeing it with apertures of at least 15". Fifteen Monocerotis is also a triple star. I could easily see the mag. 9.8 C component 16.6" away but not the mag. 7.5 B component 2.8" away from the primary. My records show I saw all three in a C-14 at 230x. Half a degree south of the Tree's top star is Struve 953, an east double star comprised of two 7th magnitude stars 7" apart. A piece of cake in the 11" at 90x. While we're splitting doubles, slide down to 8 Mon. This is an Albireo–like yellow and blue pair easily split in the 11" at 90x. The two stars are mag. 4.4 and 6.6 separated by 12.5". Even my 85mm refractor at 29x split them.

NGC 2264, the Christmas Tree Cluster

From 8 Monocerotis, go east about 2 degrees and you'll run into what is arguably the most famous object in Monoceros, NGC 2237/2244, the Rosette Nebula. The 0.9 degree field of the 11" can accommodate most of NGC 2244's brightest stars, a fine cluster in its own right. But like the Cone Nebula, the Rosette Nebula, beautifully depicted in astrophotographs, is just that, a photographic object. However, with perseverance (and maybe a nebula filter), you can pick out chunks of this emission nebula. The circular nebula is large, about 1 to 2 degrees across. I found the best view to be with my 20x100 binoculars, with their 2.5 degree field, which enabled me to view the entire nebula and cluster. Moving the instrument to and fro helped me pick out brighter sections of the Rosette, which I found to be on the north and west sides.



NGC 2237, the Rosette Nebula

Our last object in the northern realms of this horned beast is Hubble's Variable Nebula (HVN), NGC 2261. To find it, go back to the Christmas Tree Cluster. Then down to the tip of the Tree. Recall Struve 953 half a degree south of that? Go there again. Now, slip half a degree to the southwest and bingo, you should sweep up what looks like a short tailed comet! Say hello to HVN. HVN is an eerie reflection nebula emanating from a T Tauri star, or proto star. The star, R Monocerotis is a variable star, as is the nebula which changes shape slightly over the years. Edwin Hubble discovered the nebula's variability in 1916. The star is fairly hidden in its cloak of dust. At 90x in the 11", the nebula is very small (2'x1'). Increasing the power to 165x improved the view of this fleeting curtain of dust. Though classified as both an emission and reflection nebula, HVN is primarily dust, thus nebula filters shouldn't be that effective on this object, which I found to be the case.

Though lacking bright stars, Monoceros offers, by virtue of its location in the winter Milky Way, a rich assortment of celestial objects. Next month we will take a look at what the bottom half of Monoceros has to offer. Remember, don't look a gift horse in the mouth!

Alien Planet Safari

by Dana Coulter

The premiere observatory of the next decade, the James Webb Space Telescope, will launch in 2014 in search of "big game"- namely, the first stars and galaxies ever formed in our Universe. But the "little game" could turn out to be just as interesting. There's a dawning awareness among astronomers that the world's largest infrared telescope is going to be a canny hunter of planets circling faraway stars.

"Webb was originally conceived to search for the first galaxies and address the big cosmological questions associated with them, but we now know it can contribute powerfully to the planet hunt," says Mark Clampin of NASA's Goddard Space Flight Center. "Exoplanets are tremendously exciting. The field is changing literally by the day. I gave a talk on exoplanets the other day, and in the time between writing and delivering the speech, astronomers announced 30 new planets!"

The Webb telescope is the tool for carrying out detailed, high precision follow-up studies of these new planets other telescopes are flushing out of hiding. And such planets are sneaky - hiding in the glare of their own "suns."

"It's like trying to find a firefly's flash in the beam from a lighthouse," says Jonathan Gardner, Webb Deputy Senior Project Scientist from Goddard. "But there are ways to do it!" One way is called "transit science," which means studying the light from a star when a planet passes in front of the star.

Size is a key advantage in the planet hunt, and Webb is a truly enormous telescope. Pictured is a life-sized model of Webb on the grounds of the Goddard Space Flight Center in Maryland.

"Webb will measure the total light the star emits and then measure the amount of light when the planet crosses in front," explains Gardner. "This telescope can even detect brightness changes that occur when the planet passes behind the star. With some Doppler measurements from ground-based surveys, all this information helps us determine the planet's mass and radius, and then astronomers can start to think about the planet's composition."

"We can also do spectroscopy during the transit," Gardner continues. "We measure the spectrum of the starlight before the transit, then again when the starlight is filtered through the planet's atmosphere during the transit."

The starlight changes as it goes through the planet's atmosphere.

"By comparing the two spectra for the star (in and out of transit), we can extract the planet's spectrum and learn about the planet's atmosphere," says Clampin. "We have to collect a lot of infrared light - a billion or more photons - for each spectral element to isolate features. Webb is perfect for this kind of study."

The telescope's huge 25 m^2 collecting area can round up the herd of photons needed. And because Webb will be kept extremely cold thanks to its enormous sunshade and its location at the L2 Lagrange point, no extraneous source of heat will contaminate signals from the cosmos.

"We're thrilled at Hubble's science, but we need low thermal background to see the faint infrared things we want to see," says Clampin. "And Hubble starts to see its own thermal signature at a certain point because it's not a very cold telescope.

"Webb will show us what the 'exoplanet zoo' looks like. This telescope will be very good at observing and taking spectra of gas giant planets, and we can take some spectral data on smaller planets, too, about Neptune-sized. Our telescope will also zoom in to study newly discovered super Earths' – planets bigger than Earth but smaller than Neptune."

Webb can also find planets on its own. "The Webb telescope will use a technique called coronagraphy to look for gas giant planets," says Gardner. "A star's light is so brilliant that it outshines any nearby planet by a million to a billion to 1, but inside three of Webb's four cameras there's a black spot the light can't go through. We'll put the star behind the black spot so we can see the planet next to the star. It's like when a car is driving toward you at night with its high beams on, and you use your hand to block out that light so you can see the road."

"Our eventual goal is to look for chemical evidence of life on some of these new planets. But we're not sure yet how well we'll be able to do that."

"Can Webb find signs of life on a planet like Earth?" asks Clampin. "The answer is probably not. A true Earth twin would be too small to emit enough infrared light from its atmosphere for Webb to pick up."

"Still, every time scientists make statements like that, someone proves them wrong. Transit science is changing so fast, it's hard to say exactly what wonders Webb's hunt will turn up."

Article courtesy of Science@NASA

Firefly Mission to Study Terrestial Gamma-ray Flashes

by Patrick Barry

High-energy bursts of gamma rays typically occur far out in space, perhaps near black holes or other high-energy cosmic phenomena. So imagine scientists' surprise in the mid-1990s when they found these powerful gamma ray flashes happening right here on Earth, in the skies overhead.

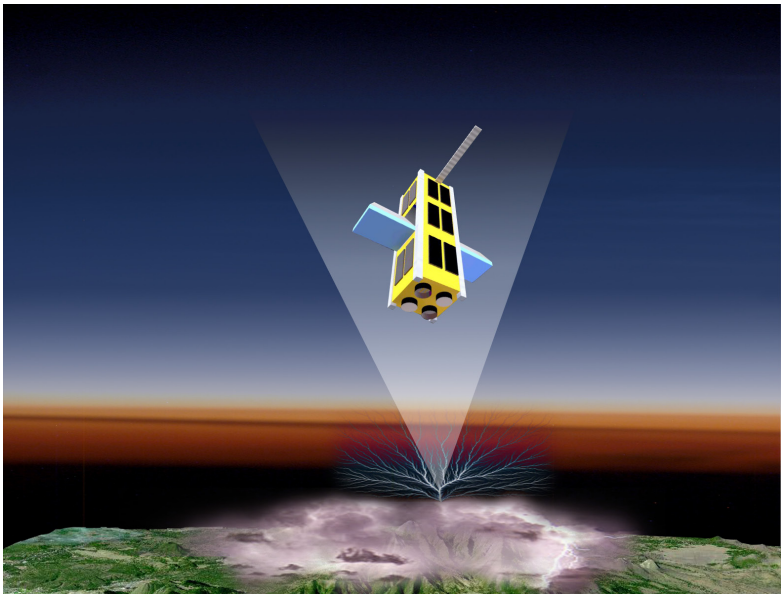
They're called Terrestrial Gamma-ray Flashes, or TGFs, and very little is known about them. They seem to have a connection with lightning, but TGFs themselves are something entirely different.

"In fact," says Doug Rowland of NASA's Goddard Space Flight Center, "before the 1990s nobody knew they even existed. And yet they're the most potent natural particle accelerators on Earth."

Individual particles in a TGF acquire a huge amount of energy, sometimes in excess of 20 mega-electron volts (MeV). In contrast, the colorful auroras that light up the skies at high latitudes are powered by particles with less than one thousandth as much energy.

At this stage, there are more questions about TGFs than answers. What causes these high-energy flashes? Do they help trigger lightning - or does lightning trigger them? Could they be responsible for some of the high-energy particles in the Van Allen radiation belts, which can damage satellites?

To investigate, Rowland and his colleagues at GSFC, Siena College, Universities Space Research Association, and the Hawk Institute for Space Sciences are planning to launch a tiny, football-sized satellite called Firefly in 2010 or 2011. Because of its small size, Firefly will cost less than $1 million - about 100 times cheaper than what satellite missions normally cost. Part of the cost savings comes from launching Firefly under the National Science Foundation's CubeSat program, which launches small satellites as "stowaways" aboard rockets carrying larger satellites into space, rather than requiring dedicated rocket launches.



An artist's concept of Firefly on the lookout for TGFs above a thunderstorm. Firefly will make simultaneous measurements of energetic electrons, gamma rays, and the radio and optical signatures of the lightning discharge.

If successful, Firefly will return the first simultaneous measurements of TGFs and lightning. Most of what's known about TGFs to date has been learned from missions meant to observe gamma rays coming from deep space, such as NASA's Compton Gamma Ray Observatory, which discovered TGFs in 1994. As it stared out into space, Compton caught fleeting glimpses of gamma rays out of the corner of its eye, so to speak. The powerful flashes were coming--surprise!--from Earth's atmosphere.

Subsequent data from Compton and other space telescopes have provided a tantalizingly incomplete picture of how TGFs occur:

In the skies above a thunderstorm, powerful electric fields generated by the storm stretch upward for many miles into the upper atmosphere. These electric fields accelerate free electrons, whisking them to speeds approaching the speed of light. When these ultra-high speed electrons collide with molecules in the air, the collisions release high-energy gamma rays as well as more electrons, setting up a cascade of collisions and perhaps more TGFs.

To the eye, a TGF probably wouldn't look like much. Unlike lightning, most of a TGF's energy is released as invisible gamma rays, not visible light. They don't produce colorful bursts of light like sprites and other lightning-related phenomena. Nevertheless, these unseen eruptions could help explain why brilliant lightning strikes occur.

A longstanding mystery about lightning is how a strike gets started. Scientists know that the turbulence inside a thundercloud separates electric charge, building up enormous voltages. But the voltage needed to ionize air and generate a spark is about 10 times greater than the voltage typically found inside storm clouds.

"We know how the clouds charge up," Rowland says, "we just don't know how they discharge. That is the mystery."

TGFs could provide that spark. By generating a quick burst of electron flow, TGFs might help lightning strikes get started, Rowland suggests. "Perhaps this phenomenon is why we have lightning," he says.

If so, there ought to be many more TGFs each day than currently known. Observations by Compton and other space telescopes indicate that there may be fewer than 100 TGFs worldwide each day. Lightning strikes millions of times per day worldwide. That's quite a gap.

Then again, Compton and other space telescopes before Firefly weren't actually looking for TGFs. So perhaps it's not surprising that they didn't find many. Firefly will specifically look for gamma ray flashes coming from the atmosphere, not space, conducting the first focused survey of TGF activity. Firefly's sensors will even be able to detect flashes that are mostly obscured by the intervening air, which is a strong absorber of gamma rays (a fact that protects people on the ground from the energy in these flashes). Firefly's survey will give scientists much better estimates of the number of TGFs worldwide and help determine if the link to lightning is real.

Article courtesy of Science@NASA

February Guest Speaker: Diedre Hunter

Dr. Hunter is interested in the physical processes taking place inside the tiniest galaxies in the Universe, the dwarf irregular galaxies. These galaxies are the most common in the Universe and in current models formed first after the Big Bang and became the building blocks of giant spirals. Dr. Hunter is also interested in the extreme outer edges of irregulars. As you go from the center of a galaxy outward, the density of stars drops. But, how do the stars and gas drop off, where do they end, and what has been the star formation history out there? Dr. Hunter is obtaining very deep images to trace the stars in the outer parts and deep radio maps to trace the gas.

◑ Last Quarter Moon on February 5 at 16:50

○ New Moon on February 13 at 19:52

◐ First Quarter Moon on February 21 at 17:42

● Full Moon on February 28 at 09:40

Basic Astronomy Four Part Lecture Series

Howard Israel's lecture series concludes at the February 2010 EVAC meeting. The final installment will begin at 6:10 pm, last for one hour, followed by a break, and then the regular EVAC meeting will begin at 7:30 pm.

Following is a brief outline of the topics covered during the lecture series:

- The terms of astronomy – words you need to know
- Star gazing basics
- Learning the sky – planets, constellations, stars, deep sky objects
- Visual observing – How to see the wonders of the heavens with your own eyes
- How to use a Planisphere
- How to read a star map
- Secrets of deep sky observing
- Where to get free astronomy software
- Choosing a pair of binoculars
- Choosing your first telescope
- Light pollution – what you can do about it

Session 1 (Oct 23rd) covers general basic astronomical terms, (ascension, declination, etc)
Session 2 (Nov 20th) covers the Solar System and how to observe planets.
Session 3 (Jan. 15th) covers deep sky observing
Session 4 (Feb. 19th) covers binoculars, telescopes, eyepieces, etc.

TeleVue TEMTS4 Mount Ring Set for 4" Diameter Tube

This 4" inside diameter ring set is brand new, never used.

$175 or trade for a TeleVue Radian 10mm eyepiece in excellent condition.

Alex Vrenios axv@att.net

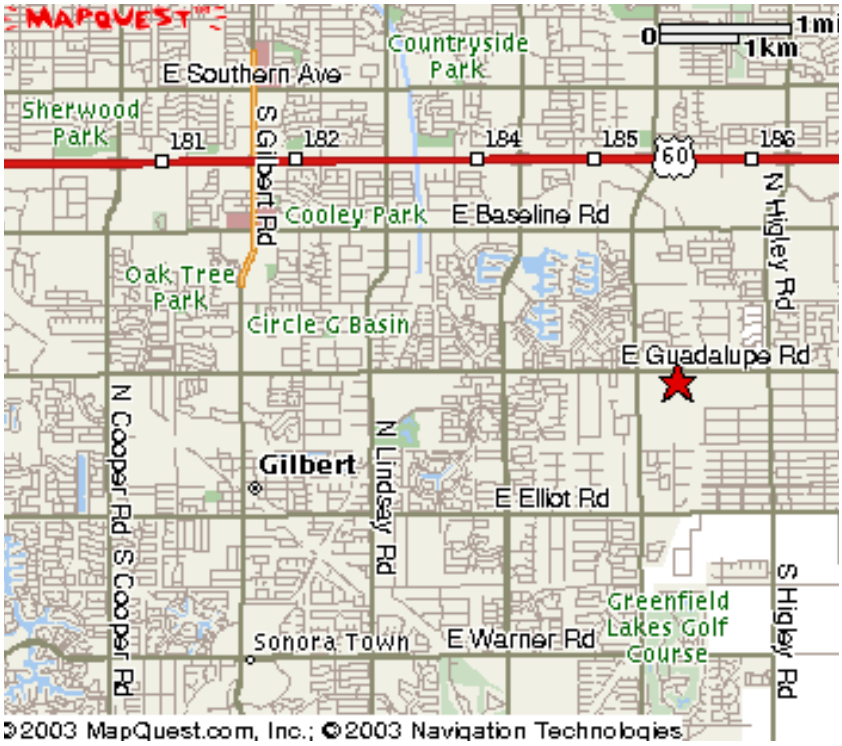
Celestron Ultima 8

Celestron 8" SCT. Heavy Duty photographer's scope with Periodic Error Correction that computer duplicates the first two minutes of hand guiding. Includes Sky Wizard computerized setting circles, tripod with bag, foam lined scope and accessories case, Celestron Ultima series eyepieces, in 4mm, 5mm, 7.5mm, 10mm, 18 mm, and 30 mm, motorized RA, Dec and Focus, manuals, star maps, books, planisphere.

$1300.

Mike Sargeant 480-839-3209

www.eastvalleyastronomy.org/grco/obs.asp

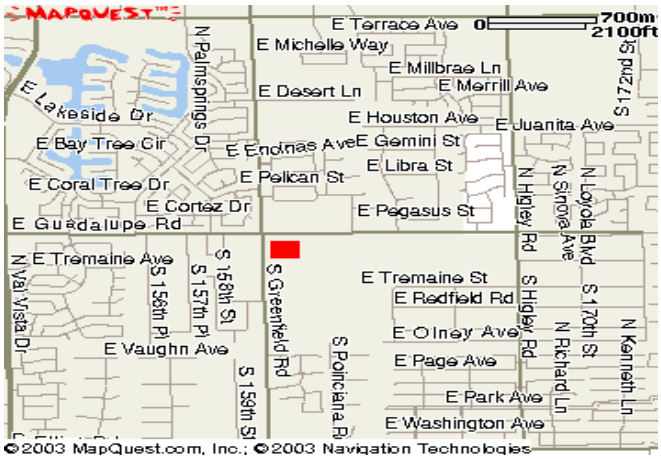


The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

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 Road; on the southeast corner of Greenfield and Guadalupe Roads.

Meetings begin at 7:30 pm.

Visitors are always welcome!



Upcoming Meetings

February 19
March 19
April 16
May 21
June 18
July 16

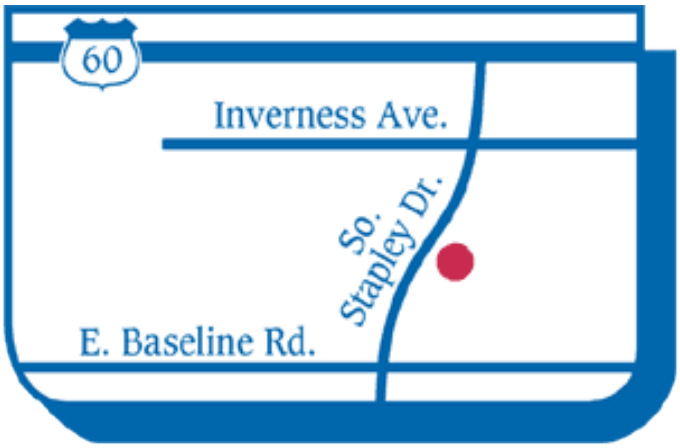
Southeast Regional Library
775 N. Greenfield Road
Gilbert, Az. 85234

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, just south of US60.

Old Country Buffet
1855 S. Stapley Drive
Mesa, Az. 85204

Likewise, all are invited to meet for coffee and more astro talk after the meeting at Denny's on Cooper (Stapley), between Baseline and Guadalupe Roads.

Denny's
1368 N. Cooper
Gilbert, Az. 85233



February 2010

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	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						

February 3 - Haley Elementary Star Party

February 4 - Humphrey Elementary Star Party

February 6 - Local Star Party at Boyce Thompson Arboretum

February 11 - Ryan Elementary Star Party

February 12 - Public Star Party & SkyWatch at Riparian Preserve

February 13 - Deep Sky Star Party at Vekol

February 17 - St. John Bosco Star Party

February 18 - Barbara Bush Elementary Star Party

February 19 - General Meeting at Southeast Regional Library

March 2010

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	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			

March 3 - Osborn Middle School Star Party

March 4 - Sousa Elementary Star Party

March 6 - Local Star Party at Boyce Thompson Arboretum

March 11 - Brinton Elementary Star Party

March 12 - Public Star Party & SkyWatch at Riparian Preserve

March 13 - All-Arizona Messier Marathon

March 13 - Deep Sky Star Party at Vekol

March 19 - General Meeting at Southeast Regional Library

March 24 - Pueblo Middle School Star Party

East Valley Astronomy Club -- 2010 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

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 I and my family 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

NASA's Space Place

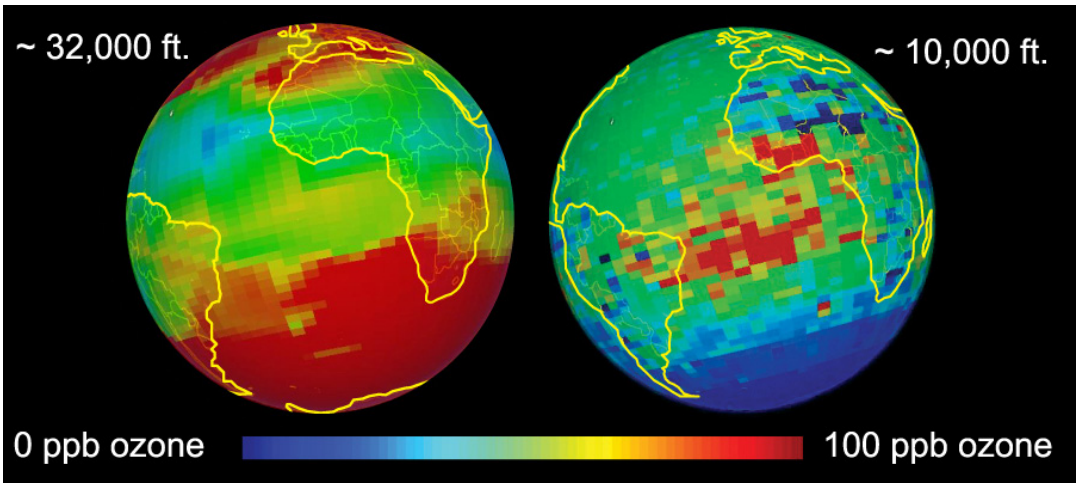
Building a Case Against Ozone

by Patrick Barry

When it comes to notorious greenhouse gases, carbon dioxide is like Al Capone - always in the headlines. Meanwhile, ozone is more like Carlo Gambino - not as famous or as powerful, but still a big player.

After tracking this lesser-known climate culprit for years, NASA's Tropospheric Emission Spectrometer (TES) has found that ozone is indeed a shifty character. Data from TES show that the amount of ozone—and thus its contribution to the greenhouse effect - varies greatly from place to place and over time.

"Ozone tends to be localized near cities where ozone precursors, such as car exhaust and power plant exhaust, are emitted," says Kevin Bowman, a senior member of the TES technical staff at the Jet Propulsion Laboratory. But the ozone doesn't necessarily stay in one place. Winds can stretch the ozone into long plumes. "Looking out over the ocean we can see ozone being transported long distances over open water."



These images are TES ozone plots viewed with Google Earth. Colors map to tropospheric ozone concentrations. The image on the left shows ozone concentrations at an altitude of approximately 32,000 feet, while the one on the right shows ozone at approximately 10,000 feet. The measurements are monthly averages over each grid segment for December 2004.

Unlike CO_2, ozone is highly reactive. It survives in the atmosphere for only a few hours or a few days before it degrades and effectively disappears. So ozone doesn't have time to spread out evenly in the atmosphere the way that CO_2 does. The amount of ozone in one place depends on where ozone-creating chemicals, such as the nitrogen oxides in car exhaust. are being released and which way the wind blows.

This short lifespan also means that ozone could be easier than CO_2 to knock off.

"If you reduce emissions of things that generate ozone, then you can have a quicker climate effect than you would with CO_2," Bowman says. "From a policy standpoint, there's been a lot of conversation lately about regulating short-lived species like ozone."

To be clear, Bowman isn't talking about the famous "ozone layer." Ozone in this high-altitude layer shields us from harmful ultraviolet light, so protecting that layer is crucial. Bowman is talking about ozone closer to the ground, so-called tropospheric ozone. This "other" ozone at lower altitudes poses health risks for people and acts as a potent greenhouse gas.

TES is helping scientists track the creation and movement of low-altitude ozone over the whole planet each day. "We can see it clearly in our data," Bowman says. Countries will need this kind of data if they decide to go after the heat-trapping gas.

Ozone has been caught red-handed, and TES is giving authorities the hard evidence they need to prosecute the case.

Learn more about TES and its atmospheric science mission at tes.jpl.nasa.gov. The Space Place has a fun "Gummy Greenhouse Gases" activity for kids that will introduce them to the idea of atoms and molecules. Check it out at spaceplace.nasa.gov/en/kids/tes/gumdrops.

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

If It's Clear...

by Fulton Wright, Jr.
Prescott Astronomy Club

February 2010

Celestial events customized (from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find information) for Prescott, Arizona. All times are Mountain Standard Time.

This is a good month to observe Mars, which shrinks from 14 arcminutes on the 1st to 12 on the 28th. After that it gets too small for a good view for the next couple of years.

On Friday, February 5, it is last quarter Moon, which rises at 1:44 AM (Feb. 6)

On Sunday, February 7, around 7:45 PM, you can see a variable star at its minimum. Algol will be at magnitude 3.4 (about the same as Alpha Triangulum) for a half hour around this time. It will brighten during the night, getting to magnitude 2.1 (about the same as Gamma Andromedae) by around midnight.

On Saturday, February 13, it is new Moon so you can look for faint fuzzies all night.

On Sunday, February 14 (happy Valentines day), about 6:30 PM you might see a tight grouping of Venus, Jupiter, and the Moon. This will be a very, very difficult observation. The sky will still be very light and the group will be very low in the west. Two days later, the Moon has moved away from the group, but Venus and Jupiter are only 1/2 degree apart. Good Luck.

On Monday, February 15, between 8:00 PM and midnight, you can see an asteroid pass between 2 stars. Vesta, the fourth asteroid discovered, is magnitude 6. It passes between Gamma Leonis (magnitude 2) and 40 Leonis (magnitude 5) which are 22 arcminutes apart. It passes closer to the dimmer star. They should be pretty much lined up at 10:00 PM. Gamma Leonis is also called Algebia and is a 5 arcsecond double star.

On Sunday, February 21, it is first quarter Moon, which sets about 2:00 AM the next morning.

EVAC membership dues are now due.
Single Membership is $30. Family Membership is $35.

If you have not already paid your 2010 dues, please consider visiting with the Treasurer before the meeting, or during the break. You can also make a check out to EVAC – Treasurer, and mail it to PO Box 2202, Mesa, Arizona 85214. Another option is to go online, and use the PayPal option. The link would be: http://evaconline.org/join_evac.htm

From the Desk of the President

Continued from page 1

fully, we will more announcements at the February meeting.

The 2010 Messier Marathon is approaching and will be held on Saturday, March 13th. This event, sponsored by SAC and co-hosted by EVAC, is usually very well attended by our membership. Be sure and mark your calendars. More information will be announced at the February meeting.

Have you ever participated in the Adopt-A-Highway clean-up of the EVAC mile? If so, you might be interested in recent developments and decisions of the board. The short version of the long story is that EVAC has been having trouble rounding up volunteers for the last several clean-ups, and ADOT wants to increase the frequency of clean-up events from two (2) times annually to four (4) times annually. The decision from the board was to not renew our contract, which has now expired. There has been a request to have the general membership review this situation, and thus, this item will be discussed during the business portion of the February meeting.

I look forward to seeing everyone at the February 19th meeting. Until then, Keep Looking Up !!

STS-130 / Endeavor

NASA is preparing to launch space shuttle Endeavour on Feb. 7th. It's the last night launch of the shuttle program and it kicks off a 13-day mission to the International Space Station (ISS).

Commander George Zamka will lead the STS-130 mission to the International Space Station aboard space shuttle Endeavour. Terry Virts will serve as the pilot. Mission Specialists are Nicholas Patrick, Robert Behnken, Stephen Robinson and Kathryn Hire. Virts will be making his first trip to space.

Shuttle Endeavour and its crew will deliver to the space station a third connecting module, the Italian-built Tranquility node and the seven-windowed cupola, which will be used as a control room for robotics. The mission will feature three spacewalks.

Liftoff from NASA's Kennedy Space Center in Florida is scheduled for February 7, 2010, at 4:39 a.m. EST

The STS-130 crew members, attired in training versions of their shuttle launch and entry suits, take a moment to pose for a crew photo prior to a training session in the Space Vehicle Mockup Facility at NASA's Johnson Space Center. Photo credit: NASA/JSC

New EVAC Members in January

Jack Kelly - Mesa

Richard Chedester - Scottsdale

Mark & Mary Piette - Chandler

James Riches - Chandler

Robert M. Forsyth - Queen Creek

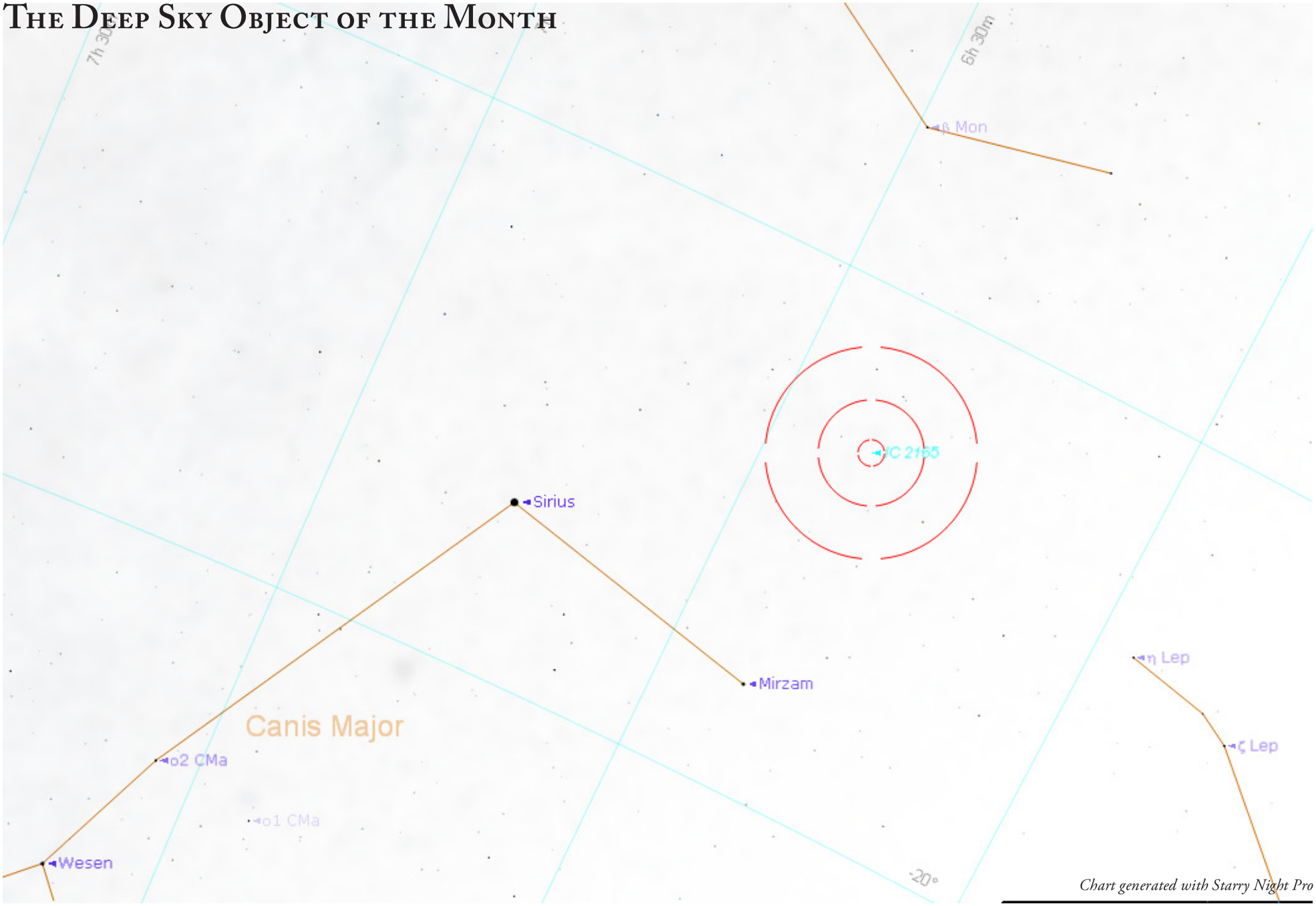


Chart generated with Starry Night Pro

IC 2165 (PK 221-12.1) Planetary Nebula in Canis Major

RA 06h 21m 42.8s DEC -12° 59' 14" Magnitude: 10.6 Size: 9.0"

Spirit is Now a Stationary Science Platform

After six years of unprecedented exploration of the Red Planet, NASA's Mars Exploration Rover Spirit is no longer a fully mobile robot. NASA has designated Spirit a stationary science platform after efforts during the past several months to free it from a sand trap have been unsuccessful.

The venerable robot's primary task in the next few weeks will be to position itself to combat the severe Martian winter. If Spirit survives, it will continue conducting significant new science from its final location. The rover's mission could continue for several months to years.

"Spirit is not dead; it has just entered another phase of its long life," said Doug McCuistion, director of the Mars Exploration Program at NASA Headquarters in Washington.

"We told the world last year that attempts to set the beloved robot free may not be successful," adds McCuistion. "It looks like Spirit's current location on Mars will be its final resting place."

Spirit's last tracks. This view from Spirit's navigation camera shows tracks left by the rover as it drove backward, dragging its inoperable right-front wheel, to the location where the rover became trapped in soft sand in April 2009.

Ten months ago, as Spirit was driving south beside the western edge of a low plateau called Home Plate, its wheels broke through a crusty surface and churned into soft sand hidden underneath.

After Spirit became embedded, the rover team crafted plans for trying to get the six-wheeled vehicle free using its five functioning wheels – the sixth wheel quit working in 2006, limiting Spirit's mobility. The planning included experiments with a test rover in a sandbox at NASA's Jet Propulsion Laboratory in Pasadena, Calif., plus analysis, modeling and reviews. In November, another wheel quit working, making a difficult situation even worse.

Recent drives have yielded the best results since Spirit became embedded. However, the coming winter mandates a change in strategy. It is mid-autumn at the solar-powered robot's home on Mars. Winter will begin in May. Solar energy is declining and expected to become insufficient to power further driving by mid-February. The rover team plans to use those remaining potential drives for improving the rover's tilt. Spirit currently tilts slightly toward the south. The winter sun stays in the northern sky, so decreasing the southward tilt would boost the amount of sunshine on the rover's solar panels.

"We need to lift the rear of the rover, or the left side of the rover, or both," said Ashley Stroupe, a rover driver at JPL. "Lifting the rear wheels out of their ruts by driving backward and slightly uphill will help. If necessary, we can try to lower the front right of the rover by attempting to drop the right-front wheel into a rut or dig it into a hole."

At its current angle, Spirit probably would not have enough power to keep communicating with Earth through the Martian winter. Even a few degrees of improvement in tilt might make enough difference to enable communication every few days.

"Getting through the winter will all come down to temperature and how cold the rover electronics will get," said John Callas, project manager at JPL for Spirit and its twin rover, Opportunity. "Every bit of energy produced by Spirit's solar arrays will go into keeping the rover's critical electronics warm, either by having the electronics on or by turning on essential heaters."

Even in a stationary state, Spirit continues scientific research.

"There's a class of science we can do only with a stationary vehicle that we had put off during the years of driving," said Steve Squyres, a researcher at Cornell University and principal investigator for Spirit and Opportunity. "Degraded mobility does not mean the mission ends abruptly. Instead, it lets us transition to stationary science."

One stationary experiment Spirit has begun studies tiny wobbles in the rotation of Mars to gain insight about the planet's core. This requires months of radio-tracking the motion of a point on the surface of Mars to calculate long-term motion with an accuracy of a few inches.

"If the final scientific feather in Spirit's cap is determining whether the core of Mars is liquid or solid, that would be wonderful -- it's so different from the other knowledge we've gained from Spirit," said Squyres.

Tools on Spirit's robotic arm can study variations in the composition of nearby soil, which has been affected by water. Stationary science also includes watching how wind moves soil particles and monitoring the Martian atmosphere.

Spirit may have been stopped, but it hasn't stopped discovering the secrets of Mars.

Edited by Dr. Tony Phillips, article courtesy of Sicence@NASA

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Keep Looking Up!

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