SkyWAAtch

The Monthly Publication of the Westchester Amateur Astronomers *May 2008*

A Close Call

The Stickney Crater on the Martian moon, Phobos, shows the aftermath of an impact that came close to shattering the Moon. This image was recorded by the HiRISE camera onboard the Mars Reconnaissance Orbiter as it passed within six thousand kilometers of Phobos in March. For more details, see: http://antwrp.gsfc.nasa.gov/apod/ap080410.html.

In any event, cosmologically speaking, Phobos may soon see its luck run out. The Moon is orbiting closer the Mars and tidal forces are expected to disintegrate it in a mere 100 million years.

Events for May 2008

➢ Monthly Meetings

"Mars Approaching Aphelion"
Friday, May 2, 8:00PM
Andrus Planetarium
Hudson River Museum, Yonkers
Mars has a more eccentric orbit than the Earth. Brother Novak will share his thoughts as Mars approaches Aphelion, its farthest distance from the Sun. Free and open to the public.

➢ Starway to Heaven

Saturday, May 3, 8:00-10:00PM
Meadow Picnic Area, Ward Pound Ridge Reservation, Cross River
This is our scheduled observing date for May, weather permitting. Free and open to the public. The scheduled rain/cloud date is May 10th.

New Members. . .

George Angelastro, Harriman, NY
Everett Dickson, White Plains, NY
Doreen Fitzpatrick, Ossining, NY
Jeffery Steinberg, Scarsdale, NY
Wayne Yee, Tuckahoe, NY

WANTED:
CLUB PHOTOGRAPHER

All that's needed is a digital camera and the willingness to attend and photograph as many club events as possible. Respond to:

Waa-newsletter@westchesterastronomers.org

Renewing Members. . .

Paul Alimena, Rye, NY
Donna Cincotta, Yonkers, NY
John Cook, Stamford, CT
Ruth Fischer, Pleasantville, NY
Gustav Forssell, Whitestone, NY
Patricia & Mike Gondek,
Hastings-on-Hudson, NY
Jon Gumowitz, White Plains, NY
John James, Sunnyside, NY
Arumugam Manoharan, Yonkers, NY
James Peale, Bronxville, NY
Karen Seiter, Larchmont, NY
Darian Taylor, Sevierville, TN
Lori Wood, Bethel, CT
Jay Yee, Dobbs Ferry, NY

FOR SALE

For Sale: Celestron CPC-1100 GPS (11" SCT) with XLT Coatings. Go-to systems works great. Scope is mounted on an Alt/Elv mount.

Scope is 1 Year old, and in perfect condition. For sale with JMI Weeley case, SCT Cooler and dew shield, 2" SCT adapter. Seller is asking $3,100 for pickup in Scarsdale, NY.

Contact: Jeffrey Steinberg, Scarsdale, NY
914-374-7503

Westchester Amateur Astronomers, Inc., a 501(c)(3) organization, is open to people of all ages with the desire to learn more about astronomy. The Mailing address is: P.O. Box 44, Valhalla, New York 10595. Phone: 1-877-456-5778. Meetings: Andrus Planetarium, Hudson River Museum of Westchester, 511 Warburton Ave., Yonkers. Observing at Ward Pound Ridge Reservation, Routes 35 and 121 South, Cross River. Annual membership is $25 per family, and includes discounts on *Sky & Telescope* and *Astronomy* magazine subscriptions. Officers: President: Charlie Gibson; Vice President: Michael Virsinger Vice President Programs (lectures): Pat Mahon; Treasurer: Doug Baum; Vice President Membership: Karen Seiter; Vice President Field Events: David Butler; Newsletter: Tom Boustead; Webmaster: Robert Davidson.

Articles and Photos Gallery

Stellar Compass for Space Explorers

by Patrick Barry

In space, there's no up or down, north or south, east or west. So how can robotic spacecraft know which way they're facing when they fire their thrusters, or when they try to beam scientific data back to Earth? Without the familiar compass points of Earth's magnetic poles, spacecraft use stars and gyros to know their orientation. Thanks to a recently completed test flight, future spacecraft will be able to do so using only an ultra-low-power camera and three silicon wafers as small as your pinky fingernail.

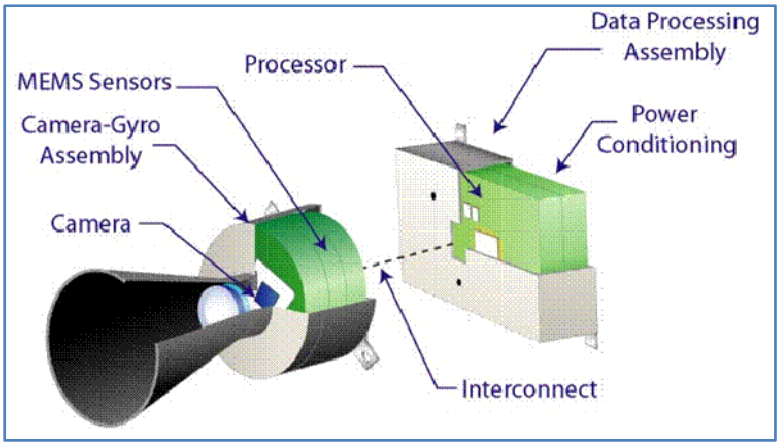
"The wafers are actually very tiny gyros," explains Artur Chmielewski, project manager at JPL for Space Technology 6 (ST6), a part of NASA's New Millennium Program. Traditional gyros use spinning wheels to detect changes in pitch, yaw, and roll—the three axes of rotation. For ST6's Inertial Stellar Compass, the three gyros instead consist of silicon wafers that resemble microchips. Rotating the wafers distorts microscopic structures on the surfaces of these wafers in a way that generates electric signals. The compass uses these signals—along with images of star positions taken by the camera—to measure rotation.

Because the Inertial Stellar Compass (ISC) is based on this new, radically different technology, NASA needed to flight-test it before using it in important missions. That test flight reached completion in December 2007 after about a year in orbit aboard the Air Force's TacSat-2 satellite. "It just performed beautifully," Chmielewski says. "The data checked out really well." The engineers had hoped that ISC would measure the spacecraft's rotation with an accuracy of 0.1 degrees. In the flight tests, ISC surpassed this goal, measuring rotation to within about 0.05 degrees.

That success paves the way for using ISC to reduce the cost of future science missions. When launching probes into space, weight equals money. "If you're paying a million dollars per kilogram to send your spacecraft to Mars, you care a lot about weight," Chmielewski says. At less than 3 kilograms, ISC weighs about one-fifth as much as traditional stellar compasses. It also uses about one-tenth as much power, so a spacecraft would be able to use smaller, lighter solar panels.

Engineers at Draper Laboratory, the Cambridge, Massachusetts, company that built the ISC, are already at work on a next-generation design that will improve the compass's accuracy ten-fold, Chmielewski says. So ISC and its successors could soon help costs—and spacecraft—stay on target.
Find out more about the ISC at:
http://nmp.nasa.gov/st6/ .

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



Compass is built as two separate assemblies, the camera-gyro assembly and the data processor assembly, connected by a wiring harness. The technology uses an active pixel sensor in a wide-field-of-view miniature star camera and micro-electromechanical system (MEMS) gyros. Together, they provide extremely accurate information for navigation and control.

Above, Rick Bria and Ted Schimenti imaged Saturn using a SPC900nc Webcam on the 14.5" RC telescope. Notes Rick: the procedure for imaging planets with a Webcam is new to us. We're getting acquainted with two new pieces of Webcam software. The first, K3CCDTools, runs the camera and stacks the best images. Then we import the result into RegiStax, for further refinement. We are still on the learning curve.

It is said that 2 in a hundred video images are of good quality. Most get blurred by atmospheric turbulence. Since we need to stack hundreds, we must record tens of thousands to produce a good result. That is what we learned from this first try.

On April 8th, Bob Kelly took this cropped image of the Moon, Earthshine and Pleiades. He used a Canon A40 on a tripod, 3x zoom 10 sec F4.8 exposure.

Observing Report, April 12th
Wards Pound Ridge

By Dave Butler

The viewing on April 12th 2008 was a transition—leaving winter targets and entering the season of globular clusters and galaxies. The viewing included a Moon over half lit, Mars and Saturn. It was our last chance to view the Orion Nebular, open clusters like the Pleiades, and the Double Cluster plus M103, which looks like a Christmas tree, the Owl or ET cluster, double star Castor and the season's first globular cluster M3.

The evening was almost warm and the skies were clear most of the evening. One guest was new to astronomy, and I showed him all the above targets plus double star Castor and galaxies M81 and M82. I usually view M81 at low power (83x to 100x) but saw a lot more detail at 250x. M82 was rather faint at this power but extended across the whole eyepiece. My guest couldn't see it until he slowly moved the target up and down then it popped out. We had the good fortune of looking through a homemade 8 inch Dobson with a self-ground mirror. His daughter and one other guest had also made their own telescope mirror. I took the opportunity of doing an optical comparison of his 8 inch homemade F/6 reflector with my 8 inch LX90 Cassegrain when viewing Saturn. His was better on the moons of Saturn showing them much more clearly, indicating that dim objects can be seen with less difficulty and perhaps more detail. Nothing can go wrong that he can't repair. Mine won on sharpness of the image. Both showed bands and picked up large numbers of dim background stars. On other nights were both able to pick up 7 moons of Saturn. Neither showed the division in the rings at the current angle. Both appeared to be fully collimated and have excellent optics. Star parties are a great way of looking at different scopes and equipment.

Constellation Corner:

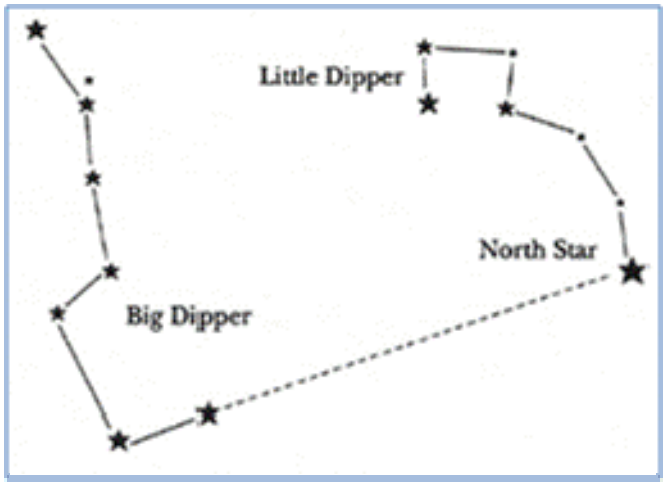
by Matt Ganis

Do you know what the stars Polaris (the brightest star in Ursa Minor), Thuban (the brightest star in the constellation Draco), Vega (the brightest star in the constellation Lyra), and Alpha Cephei (the brightest star in the constellation Cepheus) all have in common? Answer: they all are stars that mark the location in the sky that the earth's axis points toward in the Northern sky. Today, that location is marked by the star Polaris in the constellation of Ursa Minor (the Lesser Bear). The Earth's rotation axis happens to be pointing almost exactly at Polaris now, but in 13,000 years the precession of the Earth's rotation axis will mean that the bright star Vega, will be approximately at the North Celestial Pole, while in 26,000 more years Polaris will once again be the Pole Star.

If you are north of the equator and you observe the stars for a few hours at night, you will notice that they all don't rise and set. The North Star, in fact, doesn't seem to move at all! Many stars near the North Star seem to circle around it never setting below the horizon. These stars are called circumpolar stars and the farther North you go, the more stars stay above the horizon. If you were at the North Pole, Polaris would be straight over your head, and all the other stars would spin around you throughout the night! This is because the Earth's axis points nearly directly at Polaris, and as we spin about the axis, everything seems to move except for that point straight over the North Pole.

Often known as either the "little dipper" or "little bear" there are many legends connected with this constellation and the pole star, Polaris. Indeed the name Ursa Minor does mean the lesser bear, but not every culture saw it that way. There is a wonderful Native American legend which tells a story of a group of hunters who got lost in the forest, when they prayed to the spirits to send them help to find their way home, a small girl appeared to them and said she was the spirit of the pole star. She then proceeded to lead them home and thereafter the star Polaris was known as the star that does not move. When they died the hunters were transported into the sky where they forever follow the pole star.

Once you are able to identify the North Star, you will be able to find North. Simply trace a line from the star to the horizon, and you've found North. To your right is East, straight behind you is South, and to your left is West. You can also determine your latitude on Earth because Polaris' altitude, or height above the horizon, is equal to an observer's latitude on the Earth. If you measure up to Polaris from your horizon, and you find that it is 45-deg above the horizon, you now know that your latitude is 45 deg North of the equator. If you were standing at the equator (0-deg latitude) looking north, the North Star would be right on the horizon, or at an altitude of 0-deg. As you move north and your latitude increases, Polaris' altitude also increases.



As legend would have it, the North Star is thought to be a steady, solitary point of light that guided sailors for ages, but there is much more to this star than meets the eye. Polaris is actually a triple (or trinary) star system. The more distant of the two companion stars is a main sequence star which orbits Polaris with a period of thousands of years. The closer companion, which is about 2000 times fainter than the main star, moves around at a distance of only about 5.1 million kilometers (or 3.2 billion miles) – roughly the distance of Pluto from the Sun. It was only in 2006 that astronomers announced that, using the Hubble Space Telescope, they had been able to resolve Polaris and its dim, nearby companion – a feat equivalent to seeing a coin from about 19 miles away. Additional observations should enable the movement of the inner star to be measured, which in turn will help to reveal Polaris's mass.

Almanac

For May 2008 by Matt Ganis

May5 May 11 May 19 May 27

Welcome to the Month of May and crisp clear evening skies!

There's not much planetary activity in this month's sky. However, what little there is can still be interesting and worthy of some good quality telescope time. Let's start out in the South eastern skies where Saturn continues to shine in the constellation of Leo the Lion. The second largest planet in our Solar System is shining at a magnitude of +0.46 – not incredibly bright, but still quite noticeable at the base of the constellation. This month Saturn halts its retrograde motion as it pulls away (to the east) from Regulus. Through a telescope, you can notice the shadow cast on the rings by the globe of the Planet since Saturn is at eastern quadrature (90 degrees east of the Sun). At this point the planet's shadow on the rings is most prominent. As the Earth moves away from Saturn the rings are beginning to close, making the magnitude of the planet dimmer over time. This month Saturn's equatorial diameter measures about 18.4 arc seconds, and the ring inclination (or tilt) is -9.9 degrees.

Jupiter rises in our eastern skies around 1:00am this month and is located in the constellation of Sagittarius. It should be quite bright in the early morning skies shining at an impressive magnitude -2.4. On May 9th Jupiter will begin it's retrograde motion and will continue it's westward trek traveling about 10° to the west over the next 4 months.

Mars spends a good part of the month traveling from the constellation Gemini into the constellation of Cancer. It's not super bright, shining at a measly magnitude +1.2. From May 22nd - 23rd the planet crosses the star cluster known as Praesepe which is visible to the naked eye as a hazy patch of light (also known as M44 , 'The Manger' or 'The Beehive Cluster' because of its binocular resemblance to a cloud of swarming bees). Mars' apparent diameter is a mere 3.7 arc-seconds across and by late November 2008, the planet becomes lost from view in the dusk twilight. This is best observed with a pair of binoculars with a nice wide field of view.

This year Astronomy day occurs on May 10, 2008. What's great about that date is that the first quarter Moon occurs on the 12th, making for relatively dark skies (when you're sharing views of the planets) yet enough Moon to shower the younger kids craters on the moon close-up and personal.

Astronomy Day is a grass roots movement designed to share the joy of astronomy with the general population - "Bringing Astronomy to the People". On Astronomy Day, thousands of people who have never looked through a telescope will have an opportunity to see firsthand what has so many amateur and professional astronomers all excited. Astronomy clubs, science museums, observatories, universities, planetariums, laboratories, libraries, and nature centers host special events and activities to acquaint their population with local astronomical resources and facilities. Many of these events are located at non-astronomical sites; shopping malls, parks, urban centers-truly, bringing Astronomy to the People. Astronomy Day is an astronomical Public Relations event that helps highlight ways the general public can get involved with astronomy - or at least get some of their questions about astronomy answered. To find an event wherever you happen to be on that day, check out: http://www.astroleague.org/al/astroday/2008-astroday.html.