

Inside **Orbit**

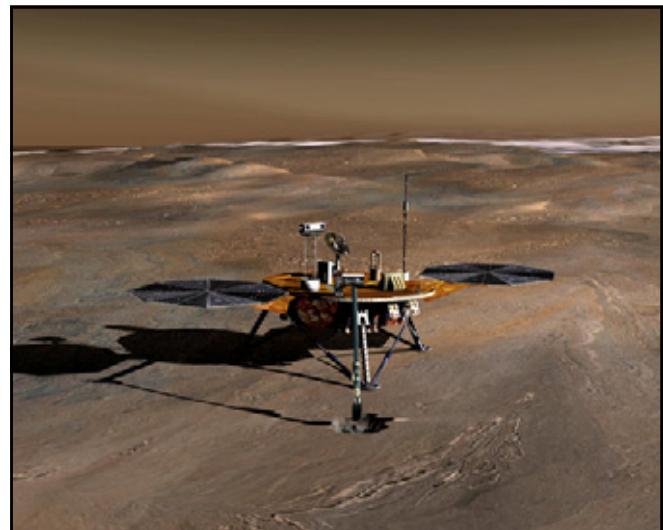
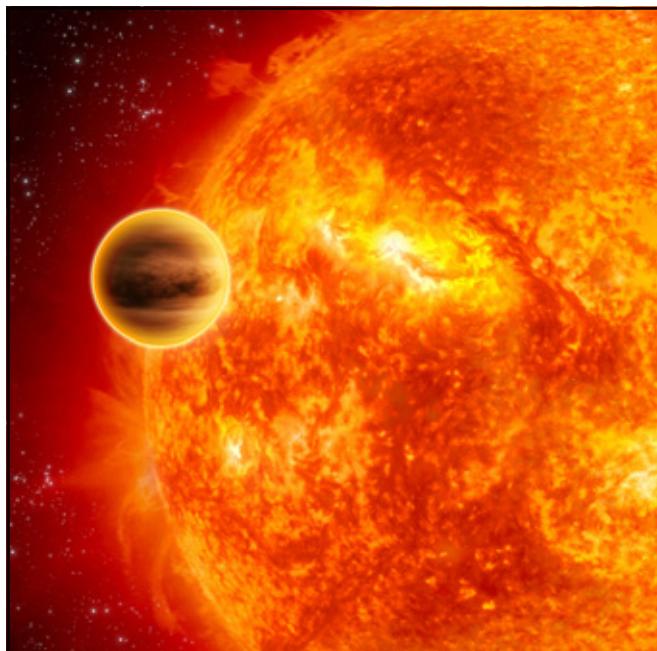
August 2007

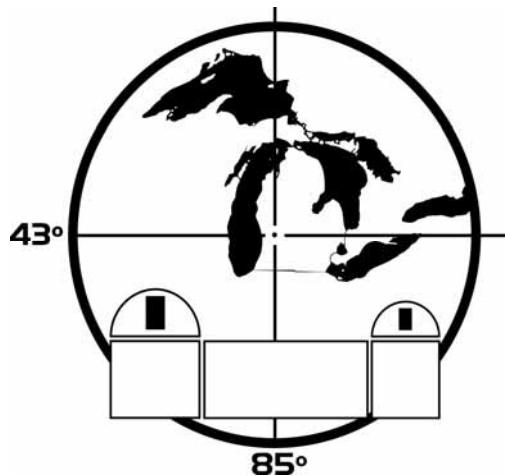
Volume XXXIII - Number VIII

A Publication of the Grand Rapids Amateur Astronomical Association

This Issue:

- ☆ Calendar of Events & News Notes
- ☆ The Solar System - August 2007
- ☆ NASA's Space Place
- ☆ Roger B. Chaffee Planetarium





Inside Orbit

A Publication of the
Grand Rapids Amateur
Astronomical Association

In This Issue:

Calendar of Events & News Notes

Happenings in the GRAAA and the astronomical community

The Solar System - August 2007 by Jeff Kozarski
*Is there a reason the moon looks red on the 28th? Can you only see the Summer Triangle for one week?
This is the article for you*

NASA's Space Place - "Tones from the Deep"

*The wonders of the world of science and technology, brought to you by NASA and
the Jet Propulsion Laboratory*

Roger B. Chaffee Planetarium

Note: Any views and opinions expressed by the authors in this publication are not necessarily those of the GRAAA or its members.

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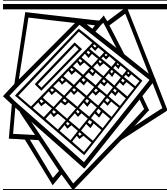
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www.graaa.org

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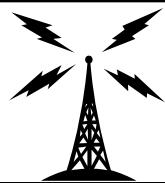
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News and Events

(Latest News and Events always online
at www.graaa.org)



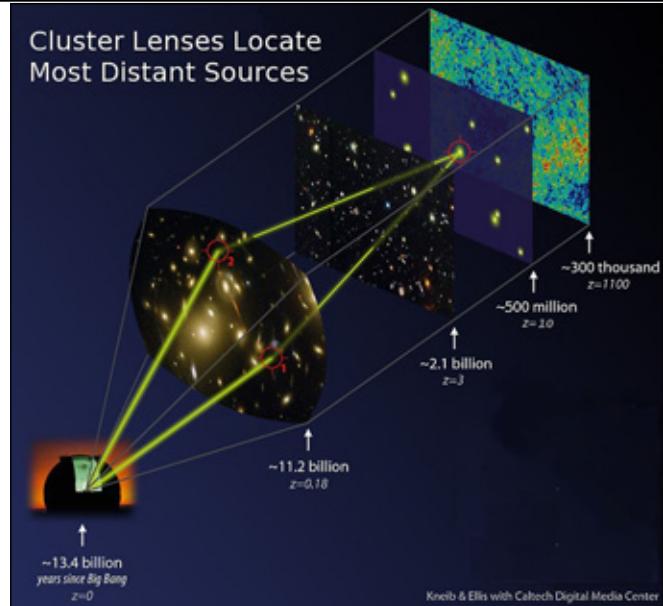
MARS AND THE MOON: Did you know that Mars is as big as the full moon? Well, it isn't, but that silly email is going around once again. If you get it, just delete it, and tell the person who sent it to head on over to the club's website, where all will be explained. This is the third year in a row for this email, let's hope it's the last.

VISITORS' NIGHTS FOR AUGUST: The Observatory will be open to the public - *clear skies only* - on Saturday, August 11th and Saturday, August 25th. Times are 9.00pm-12.00am. Come out and help if you can. As usual, emails will be sent out the week of the particular night as a reminder to all. The 11th we will be featuring the Perseid Meteors, and could use a little extra help.

GRAAA ONLINE FORUM: Just a reminder of the forum for club members. It's a great place to get the latest scoop on club (and general astronomy) news, observing tips & tricks, and a whole bunch of other fun and informative things for all members to share in. You can find a link to the Forum in the Members' Section of the website. It hasn't been used much - c'mon people!!

SEPTEMBER INSIDE ORBIT: The deadline for submissions to the September *Inside Orbit* is August 18th. If you'd like to write anything, please feel free to do so. The editorial staff is very relaxed concerning submissions, and take anything that's remotely interesting. In fact, they will almost guarantee that it will be published.

ASTRONOMERS CLAIM TO FIND THE MOST DISTANT KNOWN GALAXIES: Using natural "gravitational lenses," an international team of astronomers claim to have found the first traces of a population of the most distant galaxies yet seen—the light we see from them today left more than 13 billion years ago, when the universe was just 500 million years old.



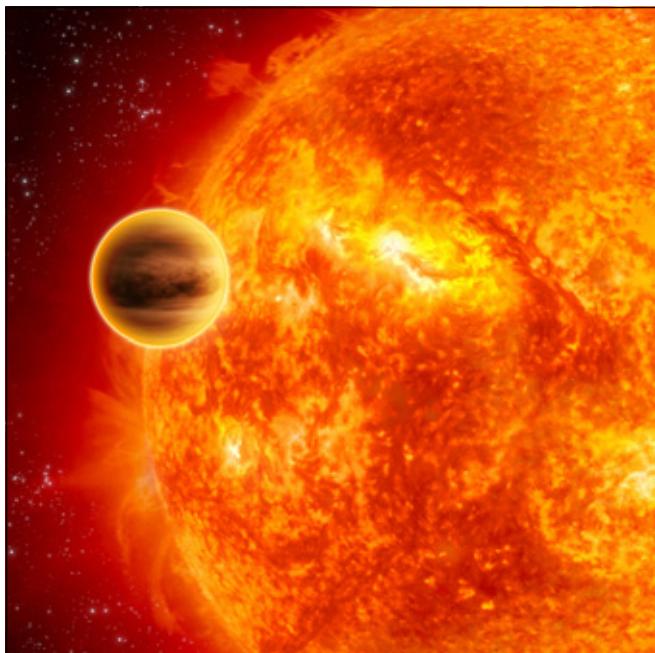
Team leader Richard Ellis, the Steele Family Professor of Astronomy at the California Institute of Technology, presented images of these faint and distant objects in his talk on July 11 at the "From IRAS to Herschel and Planck" conference at the Geological Society in London. The meeting was held to celebrate the 65th birthday of Royal Astronomical Society President Professor Michael Rowan-Robinson.

NASA'S SPITZER FINDS WATER VAPOR ON HOT, ALIEN PLANET: A scorching-hot gas planet beyond our solar system is steaming up with water vapor, according to new observations from NASA's Spitzer Space Telescope.

The planet, called HD 189733b, swelters as it zips closely around its star every two days or so. Astronomers had predicted that planets of this class, termed "hot Jupiters," would contain water vapor in their atmospheres. Yet finding solid evidence for this has been slippery. These latest data are the most convincing yet that hot Jupiters are "wet."

"We're thrilled to have identified clear signs of water on a planet that is trillions of miles away," said Giovanna Tinetti, a European Space Agency fellow at the Institute d'Astrophysique de Paris in

France. Tinetti is lead author of a paper on HD 189733b appearing today in *Nature*.

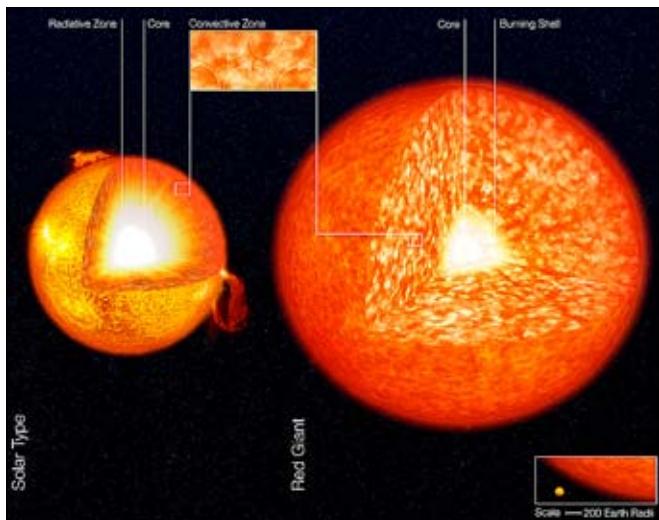


BENCHMARK SURVEY SHOWS THAT GIANT OUTER EXTRASOLAR PLANETS ARE RARE: Astronomers who used powerful telescopes in Arizona and Chile in a survey for planets around nearby stars have discovered that extrasolar planets more massive than Jupiter are extremely rare in other outer solar systems.

University of Arizona astronomers and their collaborators from the European Southern Observatory, the Max Planck Institute for Astronomy in Heidelberg, Italy's Arcetri Observatory, the W.M. Keck Observatory and the Harvard-Smithsonian Center for Astrophysics just concluded a benchmark three-year survey using direct detection techniques sensitive to planets farther from their stars. The survey looked at 54 young, nearby stars that were among the best candidates for having detectable giant Jupiter-like planets at distances beyond five astronomical units (AU), or the distance between Jupiter and the sun. One AU is the distance between Earth and the sun.

STAR SURFACE POLLUTED BY PLANETARY DEBRIS: Looking at the chemical composition of stars that host planets, astronomers have found that while dwarf stars often show iron enrichment on their surface, giant stars do not. The astronomers think that the planetary debris falling onto the outer layer of the star produces a detectable ef-

fect in a dwarf star, but this pollution is diluted by the giant star and mixed into its interior.



"It is a little bit like a Tiramisu or a Capuccino," says Luca Pasquini from ESO, lead-author of the paper reporting the results. *"There is cocoa powder only on the top!"* Just a few years after the discovery of the first exoplanet it became evident that planets are preferentially found around stars that are enriched in iron. Planet-hosting stars are on average almost twice as rich in metals than their counterparts with no planetary system.

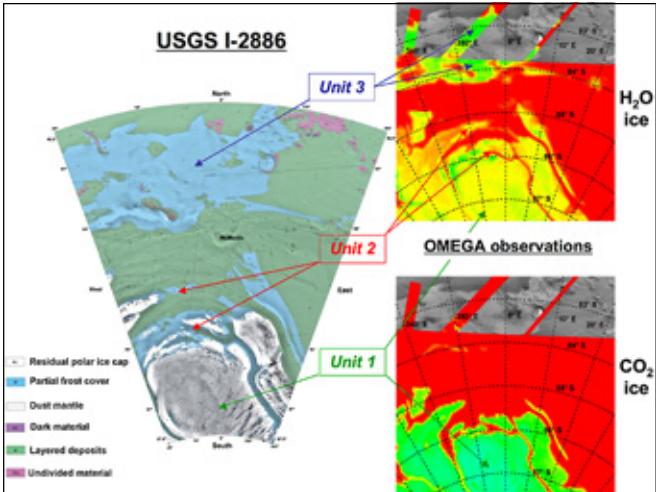
ASTRONOMERS DISCOVER THE POWER BEHIND SUPERNOVAE: A spectacular supernova witnessed last year was fuelled by matter streaming in from a nearby red giant star, according to astronomers in Europe, Japan and the US. The discovery, which was made using the European Southern Observatory's Very Large Telescope, could help in understanding exactly why some stars end their lives in such a dramatic way.

Type Ia supernovae are thought to be produced when the gravitational pull of a white dwarf star draws in enough material from its surroundings to begin nuclear fusion on a large scale, exploding the star into a fleeting object as bright as a billion Suns.

Astronomers had thought these relatively-common events all gave off the same amount of light. As a result, they have been used as "standard candles" for judging distances across the cosmos.



THE ORIGIN OF PERENNIAL WATER-ICE AT THE SOUTH POLE OF MARS: Thanks to data from ESA's *Mars Express* mission, combined with models of the Martian climate, scientists can now suggest how the orbit of Mars around the Sun affects the deposition of water ice at the Martian South Pole.

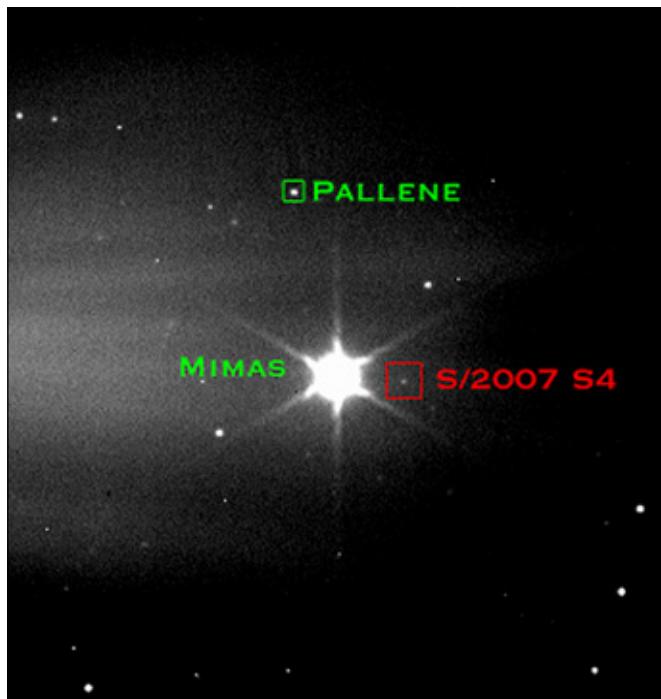


Early during the mission, the OMEGA instrument (Visible and Infrared Mineralogical Mapping Spectrometer) on board *Mars Express* had already found previously undetected perennial deposits of water-ice. They are sitting on top of million-year old layered terrains and provide strong evidence for a recent glacial activity.

THE GOBBLING DWARF THAT EXPLODED: A unique set of observations, obtained with ESO's VLT, has allowed astronomers to find direct evidence for the material that surrounded a star before it exploded as a Type Ia supernova. This strongly supports the scenario in which the explosion occurred in a system where a white dwarf is fed by a red giant.

Because Type Ia supernovae are extremely luminous and quite similar to one another, these exploding events have been used extensively as cosmological reference beacons to trace the expansion of the Universe. However, despite significant recent progress, the nature of the stars that explode and the physics that governs these powerful explosions have remained very poorly understood.

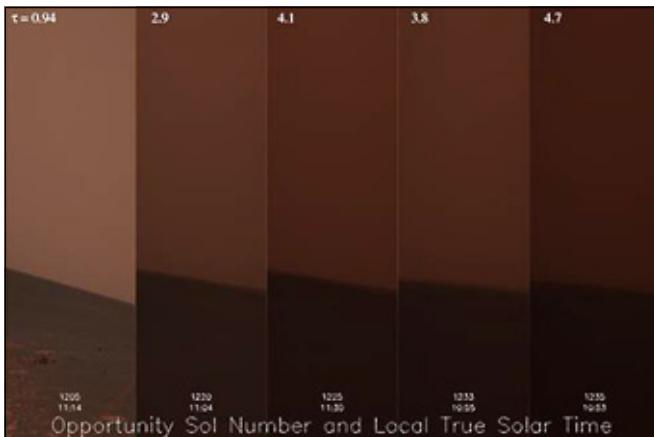
SATURN TURNS 60: Scientists have recently discovered that the planet Saturn is turning 60 - not years, but moons.



"We detected the 60th moon orbiting Saturn using the Cassini spacecraft's powerful wide-angle camera," said Carl Murray, a Cassini imaging team scientist from Queen Mary, University of London. "I was looking at images of the region near the Saturnian moons Methone and Pallene and something caught my eye."

NASA MARS ROVERS BRAVING SEVERE DUST STORMS:

NASA's Mars Exploration Rover *Opportunity* sent signals Monday morning, July 23, indicating its power situation improved slightly during the days when it obeyed commands to refrain from communicating with Earth in order to conserve power.



This image is a time-lapse composite where each horizon-survey image has been compressed horizontally (but not vertically) to emphasize the sky where *Opportunity* is. Image credit: NASA/JPL-Caltech/Cornell

Dust storms on Mars in recent weeks have darkened skies over both *Opportunity* and its twin, *Spirit*. The rovers rely on electricity that their solar panels generate from sunlight. By last week, output from *Opportunity*'s solar panels had dropped by about 80 percent from a month earlier.

PLANETS WITH FOUR PARENTS? SPITZER FINDS EVIDENCE FOR STRANGE STELLAR FAMILY:

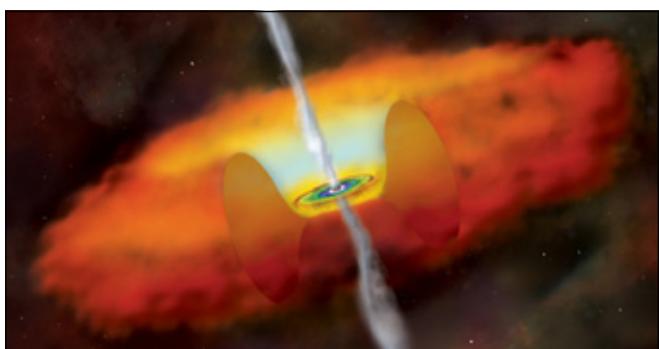
How many stars does it take to "raise" a planet? In our own solar system, it took only one -- our Sun. However, new research from NASA's *Spitzer Space Telescope* shows that planets might sometimes form in systems with as many as four stars.

Astronomers used Spitzer's infrared vision to study a dusty disk that swirls around a pair of stars in the quadruple-star system HD 98800. Such disks are thought to give rise to planets. Instead of a smooth, continuous disk, the telescope detected gaps that could be caused by a unique gravitational relationship between the system's four stars. Alternatively, the gaps could indicate planets have already begun to form, carving out lanes in the dust.



CHANDRA CATCHES "PIRANHA" BLACK HOLES:

Supermassive black holes have been discovered to grow more rapidly in young galaxy clusters, according to new results from NASA's *Chandra X-ray Observatory*. These "fast-track" supermassive black holes can have a big influence on the galaxies and clusters that they live in.



Using Chandra, scientists surveyed a sample of clusters and counted the fraction of galaxies with rapidly growing supermassive black holes, known as active galactic nuclei (or AGN). The data show, for the first time, that younger, more distant galaxy clusters contained far more AGN than older, nearby ones.

INFORMATION SPOT: Kelvin

is a unit of temperature equal in magnitude to Celsius (1 K = 1 degree C) and abbreviated with K. Zero degrees Celsius, the freezing point of water, equals 273.15 K. Absolute Zero is defined as 0 K. The surface of the Sun is about 6000 K, while nuclear fusion reactions deep in the center of the Sun raise the temperature to about 15 million K.

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...news to be continued next month



The Solar System: August 2007

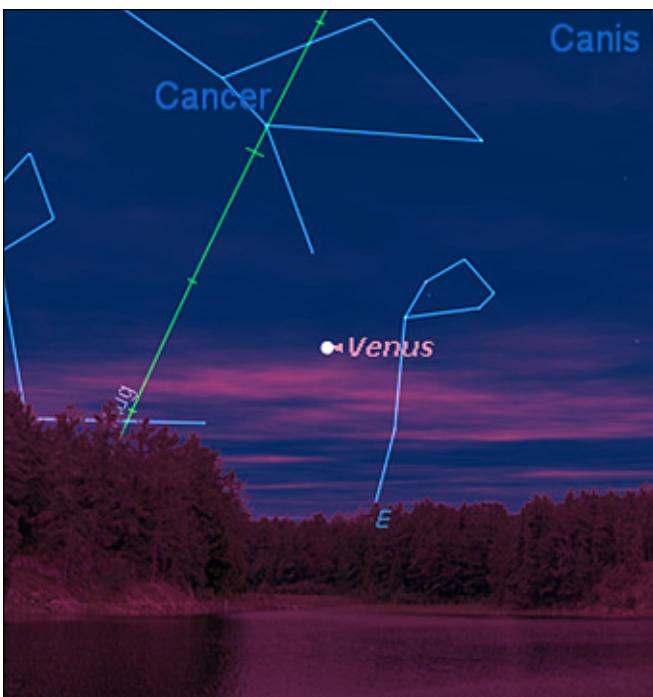
by Jeff Kozarski

August skies highlight several solar conjunctions amongst the planets. But many other events such as a lunar eclipse and the annual Perseid meteor shower are worth staying up for. Venus joins Mars in the morning sky late in the month. Jupiter is at the meridian at sunset by mid-month. Uranus & Neptune are prime telescopic objects by late in the evening.

Mercury is in conjunction with the Sun around August 15th and may be briefly visible about an hour before sunrise for the first few mornings of the month very low in the ENE.

It returns to the evening sky for a very poor apparition next month.

Venus concludes its excellent evening apparition this month on the 16th when it reaches inferior conjunction with the Sun. It will be setting a half-hour after the Sun on the 1st of the month, rendering it nearly impossible to see. The best chance to see Venus will be near the end of the



Venus before sunrise on the 31st a half-hour before sunrise.

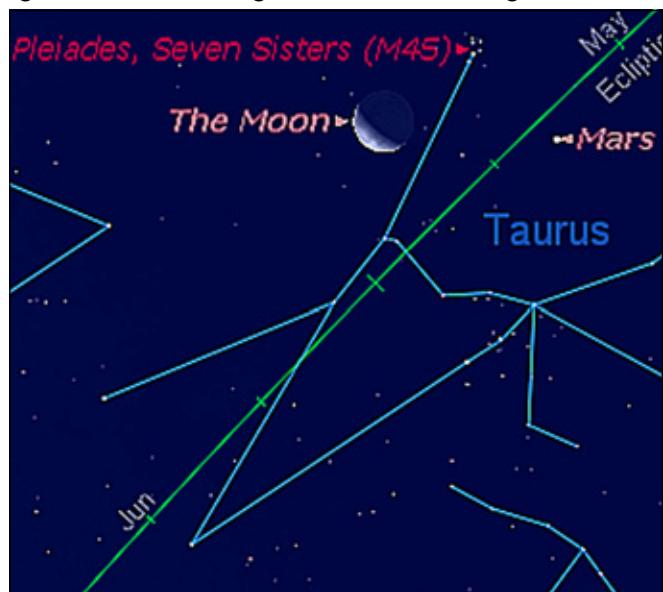
month as it ascends fairly rapidly up into the predawn sky. By then it will be rising nearly 1½ hours before the Sun and gleam at -4.3 magnitude. A telescope will show a skinny 8% illuminated crescent 53" of arc wide.

August 2007 Lunar Data:

- ★Last Quarter on the 5th at 5.20pm EDT
- ★New Moon on the 12th at 7.02pm EDT
- ★First Quarter on the 20th at 7.54pm EDT
- ★Full Moon on the 28th at 6.35am EDT

A **Total Lunar Eclipse** occurs on the morning of August 28th during the predawn hours. It is already underway at the start of astronomical twilight (5:19 a.m. EDT).

Mars is in Taurus this month. It is a reasonably bright naked eye ruddy object shining at +0.5 magnitude early in the month. By the end of August, Mars has brightened to +0.2 magnitude.



A telescope still shows a small disk, 7.5" of arc wide on the 15th. It will not reach the 12" of arc minimum most observers consider large

(Continued on page 7)

Note: These articles are courtesy **NASA Space Place Program** at the Jet Propulsion Laboratory.

Tones from the Deep

by Patrick Barry and Tony Phillips

Now is an exciting time for space enthusiasts. In the history of the Space Age, there have never been so many missions "out there" at once. NASA has, e.g., robots on Mars, satellites orbiting Mars, a spacecraft circling Saturn, probes en route to Pluto and Mercury—and four spacecraft, the Voyagers and Pioneers, are exiting the solar system altogether.

It's wonderful, but it is also creating a challenge.

The Deep Space Network that NASA uses to communicate with distant probes is becoming overtaxed. Status reports and data transmissions are coming in from all over the solar system—and there's only so much time to listen. Expanding the network would be expensive, so it would be nice if these probes could learn to communicate with greater brevity. But how?

Solving problems like this is why NASA created the New Millennium Program (NMP). The goal of NMP is to flight-test experimental hardware and software for future space missions. In 1998, for instance, NMP launched an experimental spacecraft called Deep Space 1 that carried a suite of new technologies, including a new kind of communication system known as Beacon

Monitor.

The system leverages the fact that for most of a probe's long voyage to a distant planet or asteroid or comet, it's not doing very much. There's little to report. During that time, mission scientists usually only need to know whether the spacecraft is in good health.

"If you don't need to transmit a full data stream, if you only need some basic state information, then you can use a much simpler transmission system," notes Henry Hotz, an engineer at NASA's Jet Propulsion Laboratory who worked on Beacon Monitor for Deep Space 1. So instead of beaming back complete data about the spacecraft's operation, Beacon Monitor uses sophisticated software in the probe's onboard computer to boil that data down to a single "diagnosis." It then uses a low-power antenna to transmit that diagnosis as one of four simple radio tones, signifying "all clear," "need some attention whenever you can," "need attention soon," or "I'm in big trouble—need attention right now!"

These simple tones are much easier to detect from Earth than complex data streams, so the mission needs far less of the network's valuable time and bandwidth, Hotz says. After being tested on Deep Space 1, Beacon Monitor was approved for the New Horizons mission, which is currently on its way to Pluto, beaming back a simple beacon as it goes.



This artist's concept shows the New Horizons spacecraft during its planned encounter with Pluto and its moon, Charon. The spacecraft is currently using the beacon monitor system on its way to Pluto. Credit: Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute (JHUAPL/SwRI)



ROGER B. CHAFFEE PLANETARIUM

Public Museum, Grand Rapids

August 2007 Show Schedule

For general and family audiences

SOLAR SYSTEM SAFARI - In this all new sky show, a jungle adventurer uses his magical camera to take visitors on an imaginary safari to the major bodies in the Solar System. Each comes alive, taking on a unique personality while describing its characteristics and oddities. **35 minutes**

SHOWTIMES: Daily at 2:00 pm
(Also Monday at 11.30am)

For general audiences

UNDER SUMMER SKIES - This is a continuation of the regular series of sky shows illustrating prominent stars, constellations, and planets currently visible, as well as special celestial events..

The planet Jupiter, the annual Perseid meteor shower and a late August total eclipse of the moon are featured. **40 minutes**

SHOWTIMES: Saturday and Sunday at 3:00 pm

Added Value: This show is free with paid Museum admission; or arrive after 2:30 p.m. for the planetarium show only and pay only \$3.00 per person.

THE GREAT SPACE CHASE - Education/Entertainment Feature with Laser Light. The planetarium's multiple audio-visual capabilities, including colorful laser graphics, illustrate an amusing tale in which a detective chases a crafty fugitive across the universe. The story is interspersed with musical interludes accompanied by dazzling special effects. . **40 minutes**

SHOWTIMES: Saturday and Sunday at 1:00 pm
(Weekdays at 3.00pm)

Solar System

(Continued from page 5)

enough to see surface details with ease, until the end of October.

Jupiter ends retrograde motion this month and is stationary in right ascension in Ophiuchus on August 7th. On the evening of the 13th; Jupiter is transiting the meridian at sunset, a sign that this current apparition is slowly winding down.

Saturn is too close to the Sun this month reaching conjunction with the Sun on August 21st in Leo. It will return to the morning sky next month.

Uranus is in Aquarius rising around 9:45 p.m. EDT. on the evening of the 15th, transiting the meridian around 3:25 a.m. EDT. Opposition is next month so get out & observe Uranus now. Uranus is quite easy to spot with binoculars as a +5.7 magnitude object. A telescope reveals a small 3.7" of arc pale greenish disk.

Neptune is opposition in Capricornus on the 13th. Neptune transits at 1:50 a.m. EDT on the night of opposition. It is easily visible with telescopes glowing softly at +7.8 magnitude as a 2.4" of arc tiny disk.

The **Perseid Meteor Shower** peaks on the morning of August 13th.

**Grand Rapids Amateur Astronomical Association
Membership Application or Renewal Form**

DATE: _____

New Membership **Renewal**

Please fill out the information below as completely as possible.
For Family memberships, please include all persons for whom membership is desired.

Please Print

Name: _____ Birthdate: _____

Address: _____

City: _____ State: _____ Zip: _____

Home Phone: _____ Cell Phone: _____

E-Mail: _____

(Note: For Family members, if more than one e-mail address, please list others on back of application)

Adult (18 or older, a Minimum of \$40.00) \$_____

Student (through 17 yrs old, a Minimum of \$25.00) \$_____

Family (all members of one family, a Minimum of \$50.00) \$_____

(Note: Contributions greater than the minimum dues are considered a donation and are tax-deductible)

Observatory Endowment Fund \$_____

Miscellaneous Donations \$_____

(Note: Contributions to these funds are tax-deductible. Indicate amount of donation)

OBSERVATORY USER FEE: (a Minimum of \$25.00 per user) \$_____

(Contributions of more than \$25 will help meet repairs and upgrade of equipment costs.)

If you are a qualified user of the Veen Observatory, and wish to remain so,
check the box for "**User Fee.**"

TOTAL ENCLOSED (From all categories above) \$_____

Make Check or Money Order to:

GRAND RAPIDS AMATEUR ASTRONOMICAL ASSOCIATION (or GRAAA)

Mail to: Jerry Persha, GRAAA Treasurer

199 Smith St.

Lowell, MI 49331

**Grand Rapids Amateur Astronomical Association
3308 Kissing Rock Ave. SE
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