

# The **ASTERISM**

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## The Opportunity to Serve

Back in February 1998, I went to the home of Roger Tuthill to purchase astronomy equipment. It was a favorite weekend pastime of mine to visit his unusual place of business, and to look over the different telescopes, books, and accessories which were displayed in his living room. New to serious observation, I found spending a little time with Roger at his storefront home could offer a wealth of information. A busy business man, I was frequently surprised and grateful at how often he would find the time to sit down with me and explain some new subject in astronomy in detail that would have taken me much longer to discover on my own.

One day, Roger asked me if I was aware there was an astronomy club nearby on the campus of Union County College. He gave me the meeting times and location of Sperry Observatory, and so began my membership at what I feel is one of the best clubs in the nation.

I was both impressed and humbled at the intellectual resources at AAI; also the wealth of history this established organization had. The telescopes housed in the domes were majestic, and the thought of one day being able to operate them was almost beyond imagination.

Before long I took the Qualified Observer's course and my services to AAI began. I started serving on the Executive Committee and later had the honor of being elected Vice President and later President.

It's been an honor to have served this wonderful group of people. There have been many challenges,

in truth more than I would have anticipated, but the thing that has gotten us through the trials has been our members' willingness to rally, work, and support each other.

Even through the tough times, AAI has remained focused on its primary mission: educating the public in the science and hobby of astronomy. In this effort, during my term in office, the public presentations such as "Fridays At Sperry" and the earlier children's talks have become a staple of our Friday public service. Continuing to grow in popularity, every year, larger groups of members and visitors from the public are attending these events.

There have been numerous and much needed equipment upgrades and maintenance

performed on our telescopes. We purchased a new ST-8 CCD camera that has dramatically increased the clubs ability to observe deep sky objects from our light polluted skies in Cranford. Just recently, we purchased the new Losmandy pier that will not only make the C-14 telescope at Jenny Jump operable again, it will now be a "go to" scope, making observing in the darker skies of Jenny Jump significantly more productive.

The great thing about accomplishing these feats has been seeing everyone working together to make things happen.

To be sure, the new administration will face their own challenges, but this will be far outweighed by the future good times we will experience together.

(continued page 6: **Opportunity**)



Vince Henderson, AAI President 2004 to 2007  
Photo credit: Jason Henderson

## Deep Sky Video Camera

I have been involved in astronomy for more than five decades, and that includes lots of serious observing. Avid observers are always looking for the darkest skies and the largest telescopes they can afford. The more aperture, the more photons of light you collect, and the fainter detail around galaxies, nebulae, and clusters you will realize. Over the many years, my telescopes grew in size from 3.5 inches (my first telescope) to twenty-five inches, my largest aperture telescope at present. I've owned at least 75 telescopes in my lifetime, and I still own approximately 35 with 11 of them six or more inches in aperture.

The Dobsonian revolution of cheaper mounts brought down the cost of large telescopes that a few decades ago would have only been available to astronomical institutions or very wealthy individuals. However, images from astrophotography with smaller 'scopes still far exceeds most visual astronomy views. Friends of mine who were imaging in light-polluted areas with telescopes less than half the size I was using were showing far more detail than I could see under very dark skies. The difference was that they were usually spending several hours imaging and then spending more time processing that image. I was at least getting my fill of photons instantly, and I felt that, even though I couldn't see as much detail, I could see many more objects in one night than astrophotographers could see in months.

A twenty-five inch telescope is a lot of telescope to haul around. I felt that anything larger really belongs in a permanent observatory like the forty-two inch telescope my friend, Tom Clark, has in Chiefland Florida. I was using a twenty-five inch telescope, and I still wasn't able to satisfy my desire to see structure in many galaxies like the CCD imagers were getting from rather small telescopes. I heard about the I/3 electronic eyepiece that would allow me to go several magnitudes deeper, so I decided to purchase one. I was tired of looking at very faint fuzzies, using averted vision, when friends of mine were showing

me marvelous detail in their CCD images of the same targets.

The I/3 helped somewhat. It was good on points of light, globular clusters, open clusters, dim moons around Uranus and Neptune, and some galaxies that had lots of red stars. However, it didn't give me the detail I was hoping for in extended objects. I'd heard of video cameras that were creating great images of

the planets after you processed the raw images for several hours, but I'm a visual observer, and I am not inclined to wait great lengths of time and go through long exposures and processing. I want almost instant gratification.

Several years ago at a local star party at the New Jersey Astronomical Association observatory in High Bridge, New Jersey under a 5<sup>th</sup> magnitude sky, I was observing M57 with my fifteen inch Dobsonian reflector. Next to me was a gentleman with a twelve inch Schmidt Cassegrain Telescope (SCT) using a cheap surveillance camera and a small monitor. Even if I had my twenty-five inch 'scope instead of the fifteen inch, I

doubt that I could have seen M57's central star, but, there on his monitor was the central star, and it only took him a couple of seconds. I was hooked. I had to try out this new technology.

Several months later, at another star party, I was using my twenty-five inch 'scope where I saw another observer who was using the *StellaCam 2* video camera on an eleven inch SCT, and he was taking amazing images that I couldn't hope to see. Shortly after this, I moved down to Florida to a 55+ adult community and started an astronomy club. Several members had problems climbing ladders. In fact, one person was in a wheel chair. That's when I decided it was time to get a very good video camera and a large monitor. I also had to decide what drive system I would utilize. My final decision was to go with my twenty inch f/5 Obsession since it would be easier to use than my twenty-five inch. I also added the Servo-Cat Go-To system and the Sky Commander digital setting circles. Mike Zamitt of Star Structure Telescopes did this installation for me. I may add a similar



Astrovid - StellaCam3 MONOCHROME CCD Video Integrating Imaging System With Cooled Thermal Management System (eyepiece shown for scale is not included).

Picture credit:

[http://www.astrovid.com/prod\\_details.php?pid=3306](http://www.astrovid.com/prod_details.php?pid=3306)

drive system to some of my other 'scopes after I get some experience using the camera.

When I was choosing the video camera, I narrowed the field to just two, the *Mallin* or the *StellaCam*. Talking to owners of these cameras at Chiefland, I decided on going monochrome (better detail than color). My call to Adirondack Video astronomy put me in touch with co-owner, John Cordiale. John told me that, in several months, a new camera called the *StellaCam 3* would be available that would far exceed the *StellaCam 2*. John told me the new camera would not be limited to 256 frames, but have an unlimited integrated frame system that would be able to pick up more detail and fainter objects.

About a month later, I received a call from Adirondack Video telling me that three cameras were available. So in November of 2006, I received my camera along with their twelve inch Pegasus monitor. It took a short time to get used to the camera because of its small field of view, its critical focusing, and the need to harness its wiring. I was able to make the camera more user-friendly by ordering an Atik 0.5 focal reducer since my focal length was 2540 millimeters. The Atik made the 'scope an f/2.5. This helped by increasing the field of view and the brightness. For critical focusing, I first locate the object using a wide-field eyepiece, then I center the object. I had measured the exact spot on the eyepiece holder where the camera comes into focus, and I put a Velcro strip along the side of the focuser to limit my "in" focus to that point.

When you use a focal reducer you will need approximately another inch of in-travel to come to focus. I had already cut one half inch from my poles because I needed the in-travel for my 1/3 eyepiece and Nagler 31mm eyepiece. At first, I still didn't have quite enough in-travel but I was able to move my mirror forward since it was near the farthest back position in the mirror cell.

I first tried the camera in a light-polluted sky where I live. The Moon was out, and I could just about find M81 and M82 visually because they were so dim. I centered M82, put the camera in, and WOW. It just blew me away! I had practically CCD camera images like those from a dark sky. The image filled the entire 12 inch screen. M81 was showing a dust lane and some very faint arms. I turned the camera to M51. Both M51 and NGC5195 just about fit on the screen. I could see all the arms, the bridge across the galaxies, and dust lanes in bright vivid detail. My friends and I couldn't believe we were witnessing these images under such terrible conditions.

On March 17, the camera had its first try under a really dark sky at Chiefland Astronomy Village. The images were so spectacular, several CCD imagers wanted me to count off 10 seconds and they just couldn't believe the images since the same images would have taken them many hours, not counting all the processing the following day. Several of the *Mallin* video cam enthusiasts came over, thinking I was embellishing the performance of the camera. Their jaws dropped when they saw the images. Some said that these were the best images they had ever seen in a video camera.

Reports of the performance got back to the manufacturer of the *Mallin Cam* via Bob Schilling who owns a *Mallin Cam*, which also can produce color images. To have color images, the camera must give up some resources resulting in some loss of detail. The manufacturer of the *Mallin Cam* has made a special monochrome camera with longer frame settings to hopefully beat the new *StellaCam 3*. Adirondack Video also heard that Bob Schilling and I decided to have a shootout at our next meeting in Chiefland using similar 'scopes and focal reducers. Adirondack Video decided to send me their newest and only *StellaCam 3*, with an integrated thermal cooling system. Under adverse conditions, the cooled unit should keep the camera working at optimum performance. The shootout was scheduled for April 14 at Chiefland. However, when I got there everyone was packing up because a big storm was expected that evening. So now the next shootout is scheduled for May 18, weather permitting.

From the testing I've done, the camera provides almost instant gratification far above anything you would expect. Even with a scope of four inch aperture you can equal scopes ten times larger in several seconds. Just think that in a six-inch 'scope and under a dark sky, you could easily get down to 18<sup>th</sup> magnitude. So far, my estimate using my twenty inch 'scope at Chiefland is that I can reach 20<sup>th</sup> to 21<sup>st</sup> magnitude in about ten to fifteen seconds.

For us visual observers who don't like waiting but would like to see images of galaxies, nebulae, and clusters that match long-exposure photographs, this is the next great leap in astronomical technology. Everyone is thinking cost, but a fair comparison would have to consider the price of a telescope ten times larger, as well as the problems of storage and transport of the larger instrument. The cost for a deep sky video camera is about the same as a fairly inexpensive CCD camera. ☆☆☆

**Stay connected:** Send your updated email address to [ray@asterism.org](mailto:ray@asterism.org)

Editor's note: The first part of this article appeared in the printed version of the April *Asterism*. The entire article was included in the online version.

## Eclipses: Not Just For Looking At

Starting in the 18th century, as transportation, equipment, and astronomical theory improved, a number of scientific discoveries resulted from studying solar eclipses.

In 1715, Edmund Halley published broadsheets describing an upcoming total eclipse over England and its predicted path. The public was urged to report their location and what they saw during the eclipse. Using these reports, Halley not only helped confirm Newton's laws, but also discovered that the Earth's rotation was slowing down due to the tidal effects the Moon had on Earth. To this day, astronomers use old eclipse reports to track this slow change.

Another solar eclipse of scientific importance was one seen in 1868 from the city of Guntur, India. Viewing that eclipse was French astronomer Pierre Janssen. During totality, Janssen used a spectroscope to study the corona and wound up making some discoveries.

First, he identified a layer of the Sun called the chromosphere, which was responsible for many of the spectral lines in the solar spectrum.

He was also able to determine that prominences, which resemble red or pink tufts of material sticking out of the eclipsed Sun were actually enormous plumes of hydrogen gas. Years later, it would be found that they are formed when gas follows magnetic field lines on the Sun.

While looking at the corona, Janssen also came across some lines in the spectrum that no one had ever seen before. This was the discovery of helium, which got its name due to being discovered on the Sun. It would not be found on Earth until 1895.

Starting with an eclipse visible in North America in 1869, astronomers noticed more odd lines in the coronal spectrum. Remembering Janssen, some scientists thought they found yet another element, which they named "coronium". However, this was not the case. In 1939, Belgian astronomer Bengt Edlen found that the lines were in fact from atoms of iron and other known elements that were subjected to such extreme temperature that they lost a number of their outermost electrons. So, instead of a new element, the lines told of the extremely high temperatures in the corona.

With that mystery solved, a new one arose. The Sun's photosphere (its "surface") has a temperature of about 5,200 degrees Kelvin (K) which is about

9,000 degrees F. Yet, the corona has a temperature of over one million degrees K. Even today, no one knows the exactly why the corona is so hot, though it is thought that magnetic fields play a role.

General Meeting May 18, 2007

### "Annual Members' Meeting"

At our final meeting of the year, AAI members share their special astronomical projects. (MAIN LECTURE HALL)

Then there was the most famous eclipse experiment of them all. In 1919, Sir Arthur Eddington, at a total eclipse on the island of Principe, photographed stars of the Hyades cluster near the eclipsed Sun. Comparing the star positions on the photographs with ones measured when the Hyades were in the night sky, Eddington found that starlight was deflected by the amount predicted by Albert Einstein in 1915 in the general theory of relativity.

In 1930, Bernard Lyot invented the coronagraph, a special kind of telescope, which uses a disk and internal baffles to block the solar disk to allow the corona to be observed at any time. While this would seem to make scientific observations of actual eclipses unnecessary, that is not so. Coronagraphs, even those on satellites, cannot observe the innermost parts of the corona. The full corona can be seen during eclipses. So even in this day and age, solar eclipses are scientifically useful.

### AAI's Contribution

Today, traveling to see solar eclipses is a full-fledged business. But how many of you know that the field of modern eclipse tourism was pioneered by a member of AAI?

In the early 1970's, the late Roger W. Tuthill started organizing eclipse trips, including one in 1973 to the North African nation of Mauritania. The trip was a success and Roger even got a medal from the president of Mauritania.

So when people discuss eclipse tours, remember that AAI was one of the first in the field.

### The Shadow Knows

Lunar eclipses are the nocturnal siblings of solar eclipses. These eclipses are seen far more frequently, and again, the reason is geometry. This time, it is the Earth that casts the shadow. As seen from the Moon, the Earth is over four times the apparent size of the Sun. Also, the shadows are much bigger. Therefore, any location where the Moon is above the horizon at eclipse time gets to see at least some of the eclipse.

The main area of scientific interest in lunar eclipses is study of the Earth's atmosphere. When a total lunar eclipse takes place, some light does reach the Moon because it is refracted by the Earth's atmosphere. Essentially, the light is from every sunrise and sunset on Earth all at once. It was reasoned back in the 18th century that the variations in color from eclipse to eclipse were due to changes in the Earth's atmosphere. If a major volcano erupts, the ash spewed into the atmosphere creates a very dark brown eclipse like the ones in 1982. If the air is devoid of large amounts of dust, the eclipse is brighter and tending towards red or orange color. One area of lunar eclipse science where amateurs have contributed is in making crater timings. This is simply timing when a crater is bisected by the umbral shadow, first when the umbra approaches the crater,

and then when it leaves. The timings then yield how much bigger the Earth's shadow is than it would be for an airless Earth.

According to a theory put forth by Erich Karoschka (University of Arizona) in an article in the September 1996 issue of *Sky & Telescope*, the shadow enlargement is at least partly affected by the amount of stratospheric ozone. The more ozone, the larger the shadow is. If this is correct, the historical record of shadow timings offers a way of tracking ozone in the days before satellite data.

But others, such as Paul Marmet and Christine Couture of the University of Ottawa, contend that the shadow enlargement is just an optical illusion. Their paper can be read at (<http://tinyurl.com/yofg3y>).

(continued page 6: **Skybox**)

## Correcting A Mistake... While Keeping The Error

by Dr. Lew Thomas

Kepler's Third Law as modified by Newton states that

$$a^3/P^2 = G(M + m)/4\pi^2 \quad (1)$$

where

a = average planet to Sun distance in meters

P = the orbital period in seconds

G = the gravity constant

$$= 6.672 \times 10^{-11} \text{ m}^3\text{kg}^{-1}\text{s}^{-2}$$

M = the mass of the Sun =  $1.9891 \times 10^{30}$  kg

m = mass of the planet in kg

for the Earth m =  $(1/328,900.55) \times M$

The Gaussian constant, k, is often used instead of GM. By agreement, it is defined as

$$k = (GM)^{0.5} \quad (2)$$

By combining (1) and (2) we obtain the value of the Gaussian constant as

$$k = (2\pi/P) [a^3/(1+m)]^{0.5} \quad (3)$$

where now

m = planet's mass with respect to the Sun

Gauss, around 1800, set a = 1 and set the Earth's period = P = 365.256385 days, and the Earth-Moon mass = m = 1/354,710 of the Sun's mass.

From (3), he then computed k as

$$k = 0.017\ 202\ 098\ 95 \quad (4)$$

Unfortunately, later and more accurate data showed that

m = 1/328,900.55 and *not* 1/354,710 and

$$P = 365.256\ 363 \quad \text{and } \textit{not} = 365.256\ 385 \text{ days}$$

Since many calculations had been made before improved values for m and P were available, and not wishing to alter these computations, by international agreement, the Gaussian value of k, as given above, was left unaltered and the astronomical unit was appropriately adjusted. Thus the Earth's mean distance from the Sun is no longer exactly 1 AU. Moreover "k", along with the speed of light, are now listed in *The Astronomical Almanac* as defining constants for astronomical computations.

Keeping "k" means we must adjust "a". This is carried out in the following manner. First, we assume a new period ( $P_E$ ) for the Earth such that

$$P_E = P (1+m)^{0.5} \quad (5)$$

where P and m are the current and correct values.

So

$$k = (2\pi/P_E) a^{1.5} \quad (6)$$

and therefore

$$a = (k P_E/2\pi)^{2/3} \quad (7)$$

$$a = 1.000\ 000\ 035 \text{ AU} \quad (8)$$

This now becomes the average distance of the Earth from the Sun by definition. Since all distances derived from Kepler's Law are reference to this value and since we know this distance is currently 149,597,870 km, no damage is incurred in adopting a fixed value for "k" -- even though we know it is incorrect!

☆☆☆

# Opportunity

I hope more new members will become motivated to step forward and make their own contributions to the club.

I would like to thank the membership and especially the Executive Committee for hanging in with me for these three years, it's been a real team effort that has paid off for us all. The status of AAI is good.

If I consider what my legacy will be, I hope everyone thinks of it as a time of unity and progress, when we got our act together on several occasions, persevered, and accomplished much.

# Continued from page 1

As we transition to a new President and Executive Committee, we should keep in mind that our strength lies in our ability to pool our talents and support one another, come what may. There will always be the human factor involved, and tempers my show themselves from time to time. But this is the natural process for development. If channeled properly there's nothing we can't accomplish.

Thank you for giving me this opportunity. I am grateful and I look forward to seeing and experiencing AAI's greater growth during the next 50 years.

☆☆☆

# Skybox

Though they may be less spectacular than the solar variety, lunar eclipses have some scientific value.

## The Future

The next solar eclipses will be on August 1, 2008 (Russia and China) and July 22, 2009 (China). The United States, has to wait until May 20, 2012 to see an annular eclipse and August 21, 2017 for a total.

As for lunar eclipses, the next one visible (at least partly) from New Jersey will be on August 28, 2007, but will take place in the predawn sky with the Moon

# Continued from page 5

setting before the end of the eclipse. The total lunar eclipse after that, on February 21, 2008 will be visible in its entirety from New Jersey. Details on these eclipses can be found on Fred Espenak's NASA site at (<http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>). Also, check out his personal website at (<http://www.mreclipse.com/MrEclipse.html>) which has lots of info as well. Now, if only we could predict eclipse weather as accurately...

☆☆☆

## MEMBERSHIP DUES

Regular Membership:	\$21
Sustaining Membership:	\$31
Sponsoring Membership:	\$46
Family Membership:	\$5
<i>Sky &amp; Telescope:</i>	\$32.95
<i>Astronomy subscription:</i>	\$34
First Time Application Fee:	\$3

*Dues can be paid in person to Membership Chair or Treasurer, or by mail to: AAI, PO Box 111, Garwood, NJ 07027-0111*

## DR. LEW'S SEMINARS

Some of the topics for upcoming seminars include:

- How do we send a vehicle to Mars?
- In the BCs, how did the Mayans forecast eclipses?
- Measuring the diameter of a lunar crater from Sperry Observatory

*(Choice of topic at Dr. Lew's seminars is determined by participants' interest)*

## FRIDAYS AT SPERRY

**May 25, 2007**

**Video: "Freedom 7 and the Voyage of Friendship 7"**

**June 1, 2007**

**Reaching to Some Great World: the Exploration of 4 Vesta updated** Al Witzgall

**June 8, 2007**

**You Don't Have to be Rembrandt: Drawing the Deep Sky**

Gordon Bond

**June 15, 2007**

**The Dawn Mission to Vesta and Ceres** Ray Shapp

## DOME DUTY SCHEDULE

May 18	Team E
May 25	Team A
June 1	Team B
June 8	Team C
June 15	Team D
June 22	Team E

## SPECIAL THANKS

Ink-saving Logo for Asterism credit: Justin Shapp

## EMAIL CONTACTS

[editor@asterism.org](mailto:editor@asterism.org)

Editor of The Asterism

Ray Shapp, Acting Editor

*Deadline for submissions to each month's newsletter is the first Friday of that month.*

[membership@asterism.org](mailto:membership@asterism.org)

AAI Membership Chair

[trustees@asterism.org](mailto:trustees@asterism.org)

All three Trustees of AAI

[ray@asterism.org](mailto:ray@asterism.org)

Ray Shapp for the website

[exec2@asterism.org](mailto:exec2@asterism.org)

*(this is a temporary address)*

Executive Committee

*All schedules above were accurate at time of publication. Please check [www.asterism.org](http://www.asterism.org) for latest information (click on "Club Activities")*

# Stunning Beauties of Our Solar System

by Ken Kremer

## Io Through Multiple Cameras



This 3 camera montage demonstrates New Horizons' ability to observe the same target at multiple wavelengths. The LORRI, MVIC and LEISA images were taken March 1, 2007 from a range of 1.4 million miles. They show fine details on Io's sunlit crescent and in the partially sunlit plume from the Tvashtar volcano, and reveal the bright night-time glow of the hot lavas at the source of the Tvashtar plume. The Long Range Reconnaissance Imager (LORRI) views from the high resolution black-and-white camera are taken at visible and slightly longer infrared wavelength. The Multispectral Visible Imaging Camera (MVIC) color camera shows the contrasting colors of the red lava and blue plume at Tvashtar, and the sulfur and sulfur dioxide deposits on Io's sunlit surface. The Linear Etalon Imaging Spectral Array (LEISA) observes targets in more than 200 separate wavelengths of infrared light and shows that the glow of the Tvashtar volcano is even more intense at infrared wavelengths and reveals the infrared glow of at least 10 fainter volcanic hot spots on the moon's night side. The brightest of these, visible to the lower right of Tvashtar, is less than 4% as bright as Tvashtar. All of these are long-lived hot spots that have been observed previously by the Galileo orbiter. Further analysis of the LEISA data will provide information on the volcanoes' temperatures, and data on the sunlit crescent of Io will reveal details of Io's surface composition.

Photo Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute  
<http://spacespin.org/mediagallery/media.php?s=20070504153329138>

Uncover more **Stunning Beauties** from the Solar System in this month's **Pictorial Supplement** available only in the online version of this newsletter.

Please contact me for further information or public outreach presentations.

Dr. Ken Kremer  
NASA JPL Solar System Ambassador  
Email: [kremerken@yahoo.com](mailto:kremerken@yahoo.com)

# Theater In The Sky

by Ron Ruemmler

May 2007 belongs to the inner planets. Mercury and Venus are both beginning periods of exceptional attractiveness enhanced by two lovely conjunctions with the evening crescent Moon.

Mercury starts the month by passing behind the Sun, but it quickly jumps high into the evening twilight. When Mercury performs this trick, it usually means just a week or two of good visibility, but this time, the little planet stays up an hour or more after sunset for a full five weeks. During the last week of May, Mercury does not set until one hour and fifty minutes after the Sun; nearly the maximum possible. On the 17th, the 29-hour-old crescent Moon passes only three degrees above Mercury, far to the lower right of brilliant Venus.

Maximum northern latitude and maximum illuminated area for Mercury occur near this time, while maximum elongation from the Sun has to wait until June. Unlike Venus, Mercury is at its brightest as an evening object well before maximum elongation. That's because too much of the dark half of the planet turns toward the Earth by the time of the maximum angular distance from the Sun. Of course, the apparent diameter of Mercury is increasing as it moves toward the Earth, but this is not nearly enough to overcome the dimming caused by the phase effect.

Venus, on the other hand, gains so much apparent diameter that its evening elongation is just the beginning of the real excitement. The planet's extreme northern latitude this month combined with Daylight Saving Time makes a midnight viewing of Venus almost possible. From New Jersey, the planet sets at 11:45 PM around the 22nd. In any case, be sure to catch the spectacular conjunction of Venus with the three-day-old Moon on the 19th. We have the best time zone in the world for this event.

Venus is so far north of our equator this month (26.0 degrees), that it actually passes directly over Hollywood, FL and Brownsville, TX in the late afternoon. These events should be visible with binoculars and, possibly, even naked eye!

Saturn is 90 degrees from the Sun in May. This is when the planet and its rings cast the maximum shadows on each other giving the most three dimensional appearance in a telescope. Jupiter now rises well before Venus sets, so the sky never lacks a bright planet. Mars is still rising about two hours before the Sun as it has for the last five months.

We have two Full Moons this month in the Americas, but the rest of the world will have to wait until next month for their "Blue Moon".

## May SKY CALENDAR

2 Wed 6:10 AM First Full Moon

3 Thu 12:00 AM Mercury passes beyond the Sun into the evening sky

9 Wed 7:00 AM Saturn at east quadrature; 90 degrees from the Sun

10 Thu 12:27 AM Last Quarter Moon

10 Thu 12:00 PM Venus at maximum northern declination (latitude)

12 Sat 8:00 PM Maximum illuminated area for Mercury

16 Wed 3:28 PM New Moon

17 Thu 9:00 PM Very thin crescent Moon upper right of Mercury

18 Fri 9:00 PM Mercury at maximum northern declination (latitude)

19 Sat 10:30 PM Crescent Moon just upper right of Venus

23 Wed 5:02 PM First Quarter Moon

31 Thu 9:04 PM Second Full Moon

31 Thu 9:30 PM Venus-Pollux-Castor in equal spaced horizontal alignment

### How can I find a member's email address?

Have you ever asked that question? The answer may be available to you 24 hours a day on the AAI website. Over a hundred AAI members have given me their permission to post their email addresses in a password-protected area in the "AAI People" section of our website. If you are a member in good standing, please consider adding your address to this valuable resource. If you are already listed, please check to be sure your info is current. To get the user name and password for access to this listing, send me an email including your full name so I can confirm your membership status. We don't share this info with anyone except other AAI members.

-- Ray Shapp [ray@asterism.org](mailto:ray@asterism.org)

# Stunning Science from Another Solar System Pictorial Supplement

by Ken Kremer

In this golden age of space exploration, the ingenuity of Earthlings has revealed the existence of the most Earth-like planet outside their solar system. Aided by a new spacecraft built by scientists on the European continent, dozens of earth-like planets may soon be discovered. Here for your enjoyment is this month's small sampling of beauties with previously undiscovered science from a multitude of solar systems that caught my attention as a NASA Solar System Ambassador from the North American continent.



The Planetary System in Gliese 581  
(Artist's Impression)

ESO Press Photo 22a/07 (25 April 2007)

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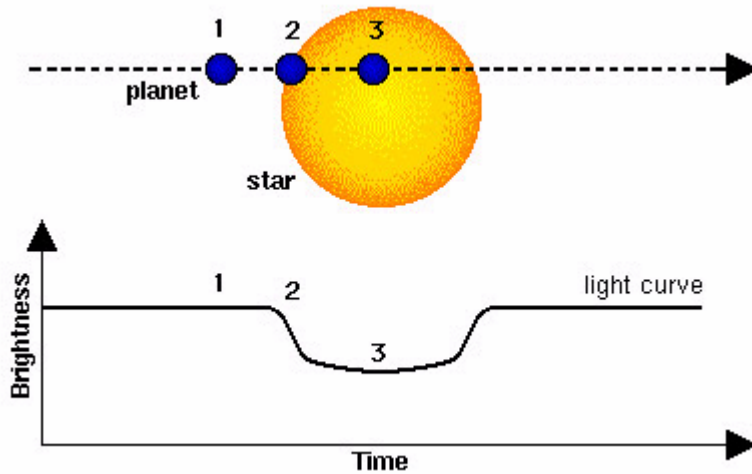
Astronomers using the 3.6 m telescope at the European Southern Observatory (ESO) have discovered the most Earth-like planet outside our Solar System to date. The exoplanet has a radius only 50% larger than the Earth, and is about 5 times the mass of the Earth. It orbits the red dwarf star Gliese 581 in 13 days at a distance that lies within the habitable zone and is thus capable of being covered with liquid water, an essential ingredient for the origin of life. Three planets were found to orbit the host star using the HARPS (High Accuracy Radial Velocity for Planetary Searcher) spectrograph. Gliese 581 is located only 20.5 years away and is among the 100 closest stars.  
<http://www.eso.org/outreach/press-rel/pr-2007/pr-22-07.html>

# Stunning Science from Another Solar System

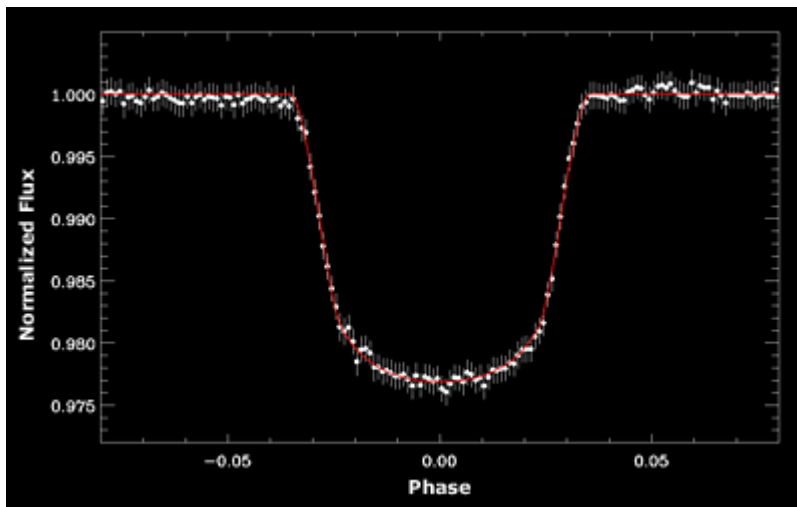
## Pictorial Supplement

by Ken Kremer

### Corot Discovers First Exoplanet



Credits: Hans Deeg



Credits: COROT exo-team

COROT was launched by a Soyuz rocket from the Baikonur cosmodrome in Kazakhstan on 27 December 2006 into an almost-circular polar orbit ranging between 895 and 906 kilometres above the Earth's surface. A few days later the spacecraft was powered on and started its science observations on 3 February this year. It has been in operation for just 60 days.

<http://www.physorg.com/news97418869.html>

The COROT spacecraft from ESA (European Space Agency) is the first space mission dedicated entirely to the search for extra-solar planets. COROT has just discovered its first exoplanet and has done so with an unanticipated level of accuracy. The data show that COROT will be able to see rocky planets - perhaps even as small as Earth - and possibly provide an indication of their chemical composition.

Now named 'COROT-Exo-1b', the object is a very hot gas giant or so called "Hot Jupiter", with a radius equal to 1.78 times that of Jupiter and a mass of about 1.3 Jupiter masses. It orbits a yellow dwarf star similar to our Sun with a period of only about 1.5 days. 'COROT-Exo-1b' is situated roughly 1,500 light years from us in the constellation Monoceros.

As shown in the top diagram, an exoplanet is detected by COROT due to a sudden decrease in the intensity of light or the 'light curve' of a parent star when a planet transits in front of it. The bottom diagram is the actual data showing the small but sharp decrease in light intensity as the planet transits in front of the star.

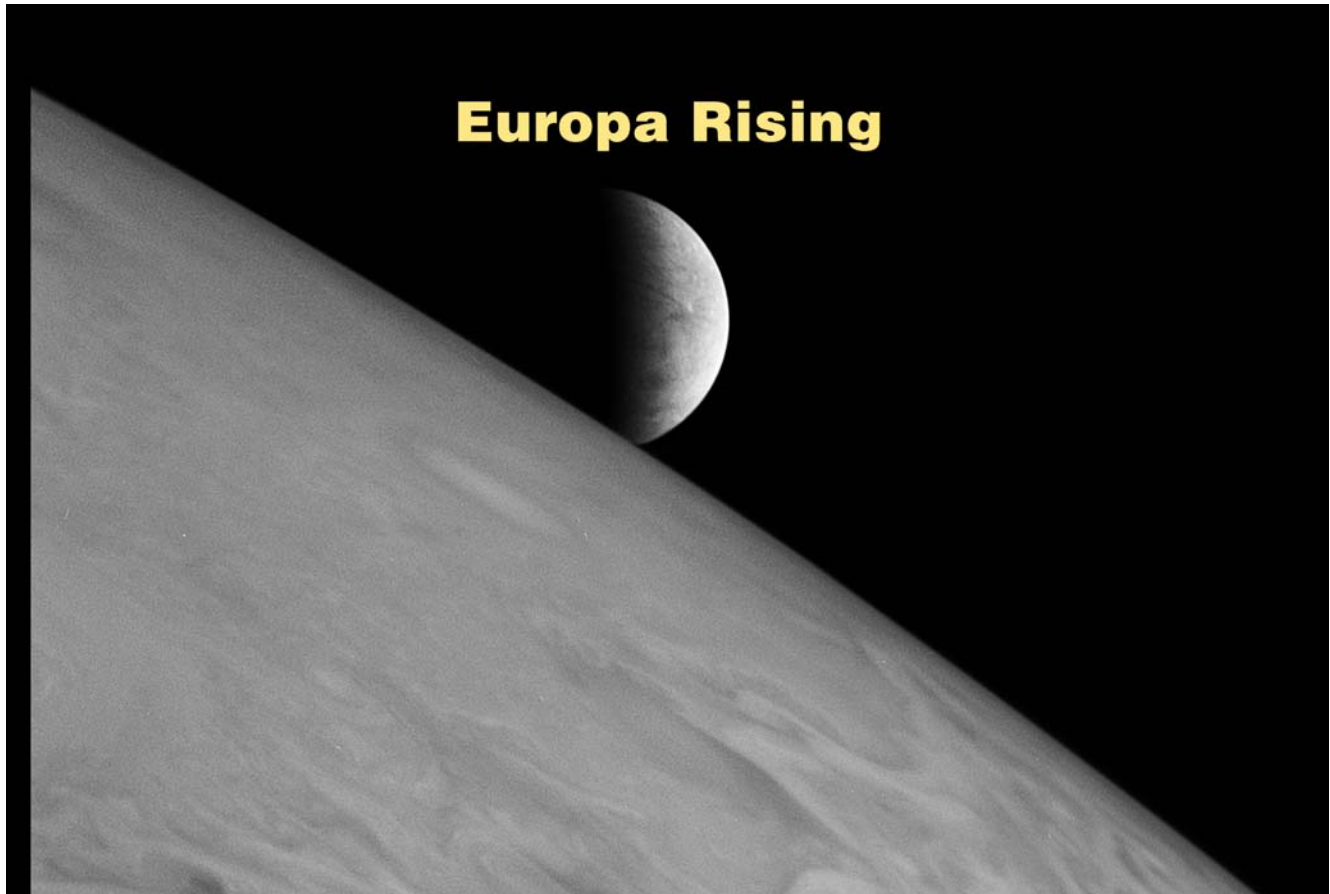
COROT's second goal is to make the most comprehensive study ever of the interior of stars other than our Sun. Both objectives are achieved by analyzing the behavior of light emitted by a target star.

# Stunning Beauties of Our Solar System

## Pictorial Supplement

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### Europa Rising Above Jupiter's Cloud tops



New Horizons took this image of the icy moon, Europa, rising above Jupiter's cloud tops with its Long Range Reconnaissance Imager (LORRI) on February 28, 2007, six hours after the spacecraft's closest approach to Jupiter. Europa is a prime target in the search for life beyond Earth since it possesses a vast underground ocean of liquid water. The picture was taken primarily for artistic, rather than scientific, value. This particular scene was suggested by space enthusiast, Richard Hendricks of Austin, Texas, in response to an Internet request by New Horizons scientists for evocative, artistic imaging opportunities at Jupiter.

The spacecraft was 1.4 million miles from Jupiter and 1.8 million miles from Europa when the picture was taken. Europa's diameter is 1,939 miles. The image has been rotated so south is at the top.

Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute  
[http://pluto.jhuapl.edu/gallery/missionPhotos/images/HighRes/050107/050107\\_01.jpg](http://pluto.jhuapl.edu/gallery/missionPhotos/images/HighRes/050107/050107_01.jpg)

More **Stunners** to be **unveiled** in full color as part of next months "**Beauties**".

Please contact me for further information or public outreach presentations.

Dr. Ken Kremer, NASA JPL Solar System Ambassador  
Email: [kremerken@yahoo.com](mailto:kremerken@yahoo.com)