



NEWSLETTER

RITTENHOUSE ASTRONOMICAL SOCIETY

Founded 1888 WWW.RITTENHOUSEASTRONOMICALSOCIETY.ORG September 2008

OPEN TO PUBLIC AND STUDENTS
Upcoming Meeting on September 10th at
7:30 PM
The Franklin
20th Street and Benjamin Franklin Parkway

September's Meeting:

StarQuest: A Beginners Guide to
Digital Astrophotography
Tim Kent

Tim Kent, author of "StarQuest: A Beginners Guide to Digital Astrophotography," will be our guest presenter. If you ever wanted to try you hand at astrophotography, you can learn how to start. Our student lesson includes a demonstration on visible light by Don Knapp (Planetarium Director of Centennial School District.) This meeting is open to the pubic. Students invited.

October's Meeting:

Members Night

Each year the Rittenhouse Astronomical Society hosts an evening where members share topics of interest to them with the rest of the memership. Each year brings great information to our members, reviewing previous topics and introducing new ones. Every member of the RAS is encouraged to get involved on member's night.

Topics presented to the membership in the past can be found our the RAS website. Presentations can be very informal. Please come and share with us a topic of your choice on members night.

Looking forward to sharing lots of ideas among our membership at our October Meeting.

Meeting Agenda

Table with 2 columns: Activity and Time. Rows include Student Check In, Astronomy Lesson, Call to Order, Sky Tonight, Guest Speaker, and Rooftop Observing.

Membership Dues:

Remember to submit your dues for this year for continued membership in the Rittenhouse Astronomical Society.

Table with 2 columns: Membership Type and Dues Amount. Rows include Adult (\$20.00), Student (\$15.00), and Premium Members (\$35.00+).

RAS, Reputation Confirmed Expanding

Ted Williams

This summer I had the opportunity to represent RAS at the International Planetarium Society held in Chicago. I presented the paper titled Conjunction which is posted on our website and portions of which have previously appeared in our newsletter. The IPS conference was the biggest in the organization's history attracting over 600 planetarium educators from around the globe. The paper I delivered will be published in the IPS conference proceedings. I'd like to thank the membership for the opportunity to represent RAS internationally.



I also had the opportunity to speak at the Hayden Planetarium this past summer, during which I was introduced as the Secretary of the Rittenhouse Astronomical Society. At the end of the presentation, a few members of the audience approached me and said they were quite aware of the RAS through use of its website. A few of the comments focused on the Astronomy Interest pages which were being used with students in public education classrooms to assist in their astronomical studies. It is quite rewarding to know our website is used not only locally but by students and teachers across the Mid-Atlantic area.

Visible Planets 09/10/2008

Table with 4 columns: Planet Name, Rises, Transit, and Sets. Rows include Mercury, Venus, Mars, Jupiter, and Saturn.

Roughing it, Thousands of Miles from Earth

An inflatable tent-like structure is being tested for potential use in manned space missions.

Eric Van Osten

When you first buy a new tent, it is always a good idea to try to pitch it at home first before taking it camping. You want to make sure that: all the correct pieces are accounted for; you can figure out the sometimes-complicated instructions; and there are no rips or flaws in it, in case you need to return it.

With expected manned trips to the moon on the horizon – and possibly even Mars in the greater future – NASA's Johnson Space Center (JSC) is currently evaluating an inflatable habitat that it hopes to use for such missions. And just like setting up your tent at home, they are testing this space tent in the desolate, almost alien world of Antarctica – because once it's being assembled on the moon, if something is amiss, there is no Wal-Mart to return it to.

JSC teamed up with the National Science Foundation, who has similar objectives of its own in its Antarctic program. Both organizations are looking for the best shelter that can protect inhabitants from harsh, unpredictable conditions. The habitat needs to be easy to move, take up little space in commute, and be habitable for working and sleeping. The inflatable habitat seems to be the best answer, as it can be disassembled and folded easily, inflated and deflated like a giant air mattress fortress, unlike hard-shell options. A company called ILC Dover is also part of the team, creating and manufacturing the habitat, including its electrical and pressurization systems.

Its structure consists of two inflatable thermally-coated halves, an inflatable airlock, doors, windows, insulation,



*Photograph by: Peter Rejcek - National Science Foundation
Date Taken: January 9, 2008*

sensors/instrumentation, and an inflation system. Internally, it measures about 16' x 24' with a maximum height of about 8'. The floor is surrounded by an insulation layer and a foam floor top. Guy lines and anchors stabilize the habitat. On the outside of the habitat are large pockets that can be used to hold soil in order to further insulate the structure and protect its inhabitants and electronics from radiation.

In January of 2008 (summer in Antarctica) it was deployed near the McMurdo science station, Antarctica. It will be studied for a year through integrated sensors, which collect data that gets logged to a local computer system, linked through the web back to NASA's Johnson Space Center. The systems of sensors throughout the habitat evaluate a large number of things. Externally, they measure light impingement, surface temperature, and wind



Antarctica - Photograph provided by ILC Dover.

speed/direction/temperature. Internally, sensors measure temperature, carbon dioxide, and consumption of power used in the forms of heat and air pump pressure. There are web cameras both outside and inside as well. Embedded in the inflatable structure are sensors that measure temperature and pressure.

After the year of testing ends, the team hopes to have collected enough data to develop long-term plans for future tests and eventual deployment. So maybe some time in the next 15 years or so, astronauts will be camping out in inflatable tents on the moon. Now if they can just figure out how to cook 's'mores around a campfire without any atmosphere...

This inflatable building was tested by NASA in Antarctica to determine if it could someday be used on the moon. NASA's Innovative Partnership Program is investigating using inflatable structures for future long-term lunar habitats. Weighing less than 1,000 pounds, the building inflates in fewer than 10 minutes. This photo was taken at McMurdo Station.

Epsilon Aurigae The Eclipsing of a Giant:

Ivin Williams

A total lunar eclipse took place in February of this year and those who watched it from the Franklin Institute's Joel N. Bloom Observatory will recall not only the eery beauty of the moon as it was swallowed by the earth's shadow but also the length of time it took for the eclipse to complete which was close to 3 1/2 hours. Yes, 3 plus hours is a long time to look up and wait for an eclipse to pass by but what if there was an eclipse out there that takes nearly 2 years to complete and on top of that, what if it is almost a complete mystery to us down here exactly what is responsible for such a long eclipse despite over 150 years of observations? Well, such an eclipse does regularly takes place and it does so every 27.1 years. Fortunately for us, this mysterious eclipse is scheduled to again take place beginning next summer and will continue into 2011. I should inform you though before everyone rushes back down to the Franklin Institute next year to observe it, that the star being eclipsed and it's eclipsing object or objects are close to 2000 light-years away and many of their chapters and secrets are written in infrared and ultraviolet ink.

Epsilon Aurigae (Epsilon) is a huge third magnitude F-type yellow-white star located in a triangle of stars known as the Kids within the northern constellation Auriga, the Charioteer. This mysterious star system is about a thumb's width southwest of Capella which is the sixth brightest star in the sky. Huge in this case is a star with a diameter slightly more than the earth-sun distance of some 93 million miles or one astronomical unit (AU). Imagine a star centered on our solar system and it engulfing planet earth. The extremely interesting and unique thing about this star though is not it's huge size but that it is eclipsed by a vastly more massive object and one with a possible hole in it's center. What colossal object could cause both the ingress (disappearance) and egress (reappearance) phases of an eclipse to last for some 6 months each and totality to last for a good whole year? What truly menacing object could once every generation dim Epsilon to 1/2 of it's brightness but midway into the eclipse allow it's light to again shine through?

The common answers to these questions seem to be almost anyone's educated guess because opinions and statistics have long widely varied. In 1904, the German Astronomer Hans Ludendorff proposed that a swarm of

meteoroids surrounded Epsilon while observations made during the 1928 - 30 eclipse pointed to a huge mass of gas that was responsible for the strange eclipse. Both of these early theoretical models held up fairly well for some observations but neither fully explained exactly what was really taking place. The problem was that neither model could account for the the gravity that would be needed to hold such an object in place as it revolves around the primary star. Something has to be buried within the ring or shell.

The Italian astrophysicist Margherita Hack began her observations of Epsilon during the 1955 - 57 eclipse and came to the conclusion that the real culprit is an invisible hot companion star surrounded by a thick shell of gas. Subsequent observations in both the ultraviolet and infrared regions of the spectrum seem to give support to the idea that Epsilon is the primary member of an eclipsing binary system where it and it's mysterious companion are gravitationally

bound together and both orbit a common center of mass. This companion does appear to be a star that is surrounded by a ring or shell comprised of either gas or dust and furthermore, seems to have some sort of doughnut like hole in the middle because there is a mid-eclipse brightning. Such a system is differentiated from so called double stars which we often view as being next door neighbors but are usually members of star systems that are vast distances away from each other.

The 1982 - 84 eclipse saw hundreds of astronomers both amateurs and professionals from all over the world point their visible, ultraviolet and infrared eyes towards this star system. Space based equipment was used for the very first time and data collected from these observations have been analyzed and reanalyzed. Still, the exact composition and nature of Epsilon's companion or companions continue to elude us. A much shorter time period between eclipses would be extremely helpful since observers can only analyze past observations but don't count on any cooperation from this mysterious object.

The upcoming 2009 - 11 eclipse should be a real bonanza for observers because a whole new generation of equipment will be available to zero in on this strange star system. Is the eclipsing object one star, two stars or multiple stars? Is Epsilon a Cepheid variable as some observations also suggest due to it's increasing light variations? 2009 is the International Year of Astronomy and observers all over the world including those of us here at the Rittenhouse Astronomical Society will be tuning into any new secrets that Epsilon Aurigae might be finally willing to share.



NASA Ambassador Update:

Dr. Ken Kremer

Daring Flight of the Phoenix:

Aviation Week & Space Technology Magazine: 9 June 2008 Cover

This Phoenix photo mosaic was created by Ken Kremer and Marco Di Lorenzo just 6 days after landing and was published on the 9 June 2008 AW&ST magazine cover and inside on p. 6. For this thrilling and superb science mission to the Martian arctic we constructed a false color mosaic of a Phoenix footpad and the “snow queen” ice feature uncovered by the action of the descent thrusters during landing. The mosaic shows large blocks of water ice right beneath the lander. Note metal spring to right of landing strut, released after landing.

The team of Ken Kremer and Marco Di Lorenzo published additional Phoenix mosaics in the July 7 and August 11 issues of Aviation Week magazine. Further original Phoenix mosaics by us will appear in my upcoming 10 page Phoenix review article in Spaceflight magazine, October 2008 monthly issue and will be featured in my Phoenix lectures.

Aviation Week complete caption and photo mosaic here:

<http://www.aviationweek.com/aw/blogs/space/index.jsp?plckController=Blog&plckScript=blogScript&plckElementId=blogDest&plckBlogPage=BlogViewPost&plckPostId=Blog%3a04ce340e-4b63-4d23-9695-d49ab661f385Post%3a0df9d0ab-ceed-4c00-9403-865345b1053d>



“Phoenix and the Snow Queen”, magazine cover on 9 June 2008. This photo mosaic was also featured on APOD on 12 June 2008. Download mosaic here: <http://antwrp.gsfc.nasa.gov/apod/ap080612.html>

Credit: Ken Kremer and Marco Di Lorenzo NASA/JPL/University of Arizona/Max Planck Institute. Photo mosaic of robotic arm camera imagery.

Learn more about Phoenix at my upcoming RAS talk on Dec 10 and other talks listed below. Phoenix discovered water ice on Mars, has just completed its 90 Sol primary mission and accomplished all objectives. Soil samples were delivered for analysis to the advanced science instruments

on board. The purpose is to search for water, organic molecules and any signs of an environment favorable for microbial life. NASA has extended the mission by another 30 Sols.

Phoenix Website: <http://phoenix.lpl.arizona.edu/index.php>

RAS Speaker update: For the upcoming 2008-2009 RAS meeting season, I have arranged for two lectures by mission scientists at the January and March 2009 meetings on the topics of NASA’s newly launched GLAST Gamma Ray Observatory (Jan 09) and the New Horizons mission to Pluto and the discovery of two new moons at Planet Pluto (Mar 09).

Astronomy Outreach

Please contact me for more info or science outreach presentations by email. My upcoming Astronomy talks include:

David Sarnoff Library; Martians for Education Festival: Princeton, NJ, Oct 22, Wed, 8 PM. “Looking for Life on Mars: Phoenix and the Twin Rovers (in 3-D)”. Website: <http://www.davidsarnoff.org>

Stella Della Valley Star Party & Bucks-Mont Astronomical Association (BMAA): Ottsville, PA, Oct 25, Sat, 2:30 PM. “Launching DAWN to Asteroids; Landing Phoenix on Icy Martian Jackpot: From Behind the Scenes at Kennedy Space Center (in 3-D)”.

Website: <http://www.bma2.org/Sdv.html>

Rittenhouse Astronomical Society (RAS) at the Franklin Institute: Philadelphia, PA, Wed, Dec 10, 8 PM. “Daring Flight of the Phoenix Mars Lander: Icy Jackpot Hit on Mars”.

Website: <http://www.rittenhouseastronomicalsociety.org>

Amateur Astronomer’s Inc (AAI) at Union County College: Cranford, NJ, Fri, Dec 19, 8 PM. “Daring Flight of the Phoenix: Icy Jackpot Hit on Mars (in 3-D)”.

Website: <http://www.asterism.org>

Doylestown Presbyterian Church: Doylestown, PA, Wed, Jan 21, 6:30 PM. “Phoenix and the Twin Mars Rovers in 3-D”

Dr. Ken Kremer Email: kremerken@yahoo.com

NASA JPL Solar System Ambassador

Our **NEW** Mailing Address:

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