



RVAS NEWSLETTER



Vol. 25 No. 1

The Roanoke Valley Astronomical Society

January 2008

Fun with Asteroid Occultation Timing

By **John Goss**

As astronomers, we have special powers, especially in the meteorology department. We can experience days of clear skies, yet hours before an observing event, clouds roll in

Lamberta.

At 9:00 p.m., the 10 day old moon was glaring high in Aries, bright Mars was rising, and Orion was climbing above the eastern skyline. That's when I moved my telescope outside and gathered the equipment

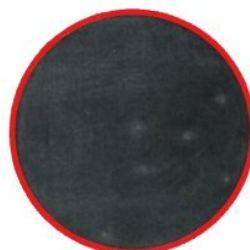
Occultation of star TYC-2416-772-1 by asteroid 187 Lamberta



12/20/2007
00:10:00 EST



12/20/2007
00:10:05 EST



12/20/2007
00:11:00 EST

Illustration by **John Goss**

seemingly out of nowhere. Sound familiar?

Wednesday December 19 was just such a day. The forecast was sunny, and sunny, it was. The evening was to be mostly clear. This all made things look good for that night's predicted occultation of the star TYC 2416 - 772 - 1 by asteroid 187

needed for recording the occultation. With another three hours of waiting, I took a quick peek at Mars then went inside to keep warm.

At 10:00 p.m., I received an e-mail message from **Michael Good** saying that clouds were moving in, interfering with his

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Asteroid to Pass Near Mars

NASA Press Release

December 21, 2007

Updated Dec. 28, 2007 -- Astronomers have identified asteroid 2007 WD 5 in archival imagery. With these new observations, scientists at NASA's Near-Earth Object Program Office at the Jet Propulsion Laboratory in Pasadena, Calif have refined their trajectory estimates for the asteroid. Based on this latest analysis, the odds for the asteroid impacting Mars on Jan. 30 are now 1-in-25 -- or about 4 percent.

For more information, visit the Near-Earth Object Program site at <http://neo.jpl.nasa.gov/>.

WASHINGTON - Astronomers funded by NASA are monitoring the trajectory of an asteroid estimated to be 50 meters (164 feet) wide that is expected to cross Mars' or-

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imaging of Mars. I looked out the window and, sure enough, only diffused moonglow was seen behind the clouds that came out of nowhere. The updated weather satellite images showed that my house sat under the leading edge of a series of cloud bands. For the next two hours, stars kept popping in and out between the slow moving bands. It didn't look good.

At 12:00 a.m., I went out to make the final cloud call and saw Auriga, the constellation where the asteroid and star were located. I had 10 minutes left before 12.6 magnitude Lamberta was to creep directly in front of the 9.4 magnitude star TYC 2416 - 772 - 1, effectively blanking it out.

Lamberta was at an altitude of 89°. Finding objects near the zenith with a Schmidt-Cassegrain requires a certain amount of acrobatic finesse. First, you point the telescope straight up. That's easy enough. Second, you put your eye up to the finderscope and turn your

head upside down while simultaneously twisting your back. Oh, and keeping your balance all the while. Somehow in all this contorting, you still must breathe. Don't forget about ob-

isn't too hard as long as your map plots stars a couple of magnitudes below the target's. For TYC 2416 - 772 - 1, this meant 11th magnitude. Many popular planetarium programs do this in a jiffy.

Orbital characteristics ¹	
Orbit type	Main belt
Semimajor axis	2.732 AU
Perihelion distance	2.084 AU
Aphelion distance	3.380 AU
Orbital period	4.52 years
Inclination	10.60°
Eccentricity	0.237

Physical characteristics ¹	
Diameter	131.2 km
Rotation period	10.663 hours
Spectral class	C
Abs. magnitude	8.16
Albedo ⁴	0.056

History ¹	
Discoverer	J. Coggia, 1878

More clouds quickly approached threatening to obscure the star. There it was, there it wasn't, and there it was again. These clouds really needed to go and soon!

Meanwhile, I flicked on my short-wave radio — the one that was originally purchased to pick up broadcasts from far off countries, but now is used exclusively for timing deep space events. The time signal on WWV's frequency of 5000 kHz came in just fine. Then I started the cassette audio recorder and made sure it wasn't

recording over some old Bee Gees tune. Then again, no loss if it did!

With everything set, I went back to the scope. Clouds continued along their way. There was nothing more I could do, but wait. With one minute to go, fortune smiled and the field

serving, too — that's what this is all about, after all. Lastly, move the telescope tube to place the reference star in the finder's cross hairs. All easier said than done!

Once the reference star — in this case, Delta Aurigae — was centered, the target was found by star hopping. This technique

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Astro-Quiz

What area of the sky holds the densest collection of Messier objects?

Answer to Last Month's Astro-Quiz: A fast test to determine a telescope's optical performance that requires no special equipment is called the "snap." According to Harold Suiter, who wrote the book on star testing telescopes, "Using high magnification, wiggle the focuser back and forth through best focus. Good telescopes will snap into crisp focus quickly. Bad telescopes will offer a range of equally acceptable focus positions, none very good. You will be uncertain where to stop your hand." However, this test only provides an indicator that all may not be well. It should be followed by the star test. For more on that, see Suiter's book, *Star Testing Astronomical Telescopes*.

January Mystery Object



This nebula, by any other name, would smell as sweet.

Send your best guess to Dave Thomas, our Mystery Object Columnist, at: ka-8-inl@hotmail.com

Quote of the Month Submitted by John Goss

Dave Barry:
"With all due respect to astronomers: We don't NEED to find anymore stuff in the universe. We already have more stuff than we could ever use, right here in our garages."

December Mystery Object



December's mystery object, NGC 1931, is an emission and reflection nebula in Auriga. It has been mistaken for a comet because of its appearance. Located at RA: 5h 31.4m and Dec: +34 deg 15 Min it glows at 11.3 magnitude. A dark sky is necessary to view this object.

The Roanoke Valley Astronomical Society is a membership organization of amateur astronomers dedicated to the pursuit of astronomical observational and photographic activities. Meetings are held at 7:30 p.m. the third Monday of each month at Center in the Square in downtown Roanoke, Virginia. Meetings are open to the public. Observing sessions are held one or two weekends a month at a dark sky site. Yearly individual dues are \$20.00. Family membership is \$25.00: student membership is \$10.00. For information, call the RVAS Message Line at 540-774-5651. Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS, its editor, officers, or individual members.

RVAS web page: <http://www.roavas.org>

Officers/Executive Committee: Mike Overacker, President/Webmaster (776-3092) Vacant, Vice President (000-0000); Mark Hodges, Secretary (774-5039); Jeff Suhr, Treasurer (563-0079); Dave Thomas, EC Member-At-Large, Newsletter editor (434-237-5135); Katherine Hix, Immediate Past President (334-2443); Paul Caffrey, Past President (345-2847)

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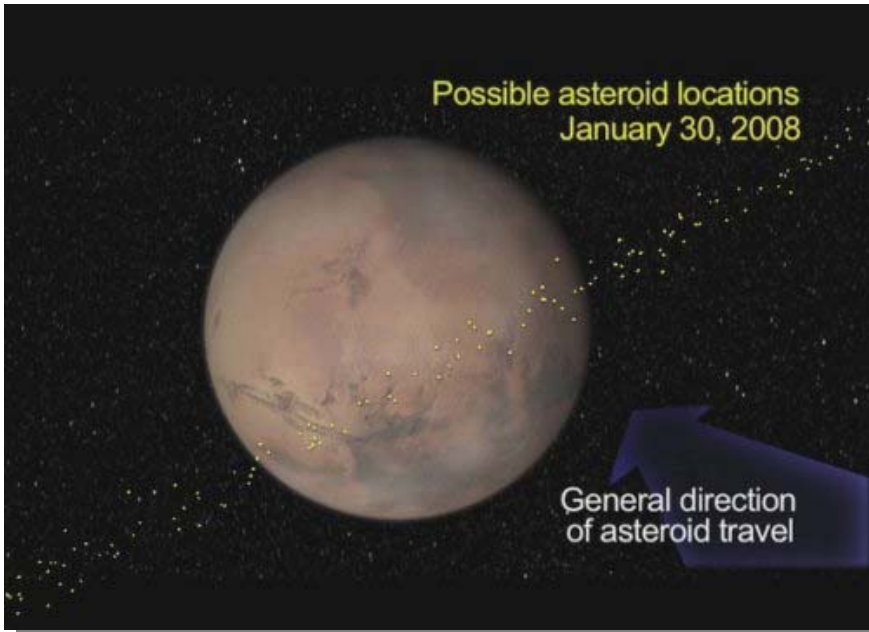
bital path early next year. Observations provided by the astronomers and analyzed by NASA's Near-Earth Object Office at the Jet Propulsion Laboratory in Pasadena, Calif., indicate the object may pass within 30,000 miles of Mars at about 6

oids and comets passing close to Earth. The Near Earth Object Observation Program, commonly called "Spaceguard," plots the orbits of these objects to determine if any could be potentially hazardous to our planet.

"Mars crossers."

Because of current uncertainties about the asteroid's exact orbit, there is a 1-in-75 chance of 2007 WD5 impacting Mars. If this unlikely event were to occur, it would be somewhere within a broad swath across the planet north of where the Opportunity rover is located.

"We estimate such impacts occur on Mars every thousand years or so," said Steve Chesley, a scientist at JPL. "If 2007 WD5 were to thump Mars on Jan. 30, we calculate it would hit at about 30,000 miles per hour and might create a crater more than half-a-mile wide." The Mars Rover Opportunity is exploring a crater approximately this size right now.



Courtesy NASA/JPL-Caltech

Such a collision could release about three megatons of energy. Scientists believe an event of comparable magnitude occurred here on Earth in 1908 in Tunguska, Siberia, but no crater was created. The object was disintegrated by Earth's thicker atmosphere before it hit the ground, although the air blast devastated a large area of unpopulated forest.

NASA and its partners will continue to track asteroid 2007 WD5 and will provide an update in January when further information is available. For more information on the Near Earth Object program, visit: <http://>

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a.m. EST (3 a.m. PST) on Jan. 30, 2008.

"Right now asteroid 2007 WD5 is about half-way between Earth and Mars and closing the distance at a speed of about 27,900 miles per hour," said Don Yeomans, manager of the Near Earth Object Office at JPL. "Over the next five weeks, we hope to gather more information from observatories so we can further refine the asteroid's trajectory."

NASA detects and tracks aster-

Asteroid 2007 WD5 was first discovered on Nov. 20, 2007, by the NASA-funded Catalina Sky Survey and put on a "watch list" because its orbit passes near Earth. Further observations from both the NASA-funded Spacewatch at Kitt Peak, Ariz., and the Magdalena Ridge Observatory in New Mexico gave scientists enough data to determine that the asteroid was not a danger to Earth, but could potentially impact Mars. This makes it a member of an interesting class of small objects that are both near Earth objects and

Dark Sky Committee Report

By **Genevieve Goss**

Do you know what an **IDSR** is? There is now one a day's drive from Roanoke. How about an **IDSP**? The first one of those was dedicated in Utah in August.

An IDSR in an International Dark Sky Reserve, defined as "...a public or private land possessing an exceptional quality of starry nights and nocturnal environment that is specifically protected for its scientific, natu-

ral, educational, cultural, heritage and/or public enjoyment mission on a large peripheral area," (IDA guidelines) This past September 20, the first IDSR was established near the city of Sherbrooke, Quebec, including the Mont Megantic National Park.

Utah's Natural Bridges National Monument was named the First International Dark Sky Park in August. As part of the award, Natural Bridges had to minimize its own light pollution in

order to share its magnificent starry skies with the its over 95,000 annual visitors. The park has retrofitted over 80% of their light fixtures with full-cutoff fixtures, so that the shielded light points downward.

Get on the Dark Skies bandwagon! Local officials can be drawn to the tourism value of preserving dark skies, as well as the cost-saving features associated with efficient lighting.

Winter Social

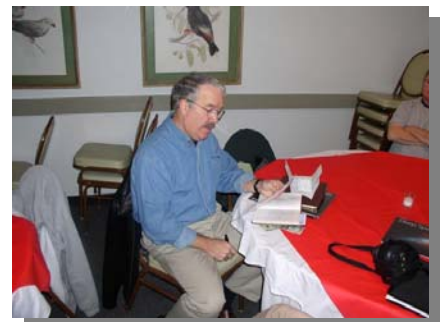


The December meeting theme was the winter social.

There was an abundance of food and drink and a good time was had by all.

Thanks to **Randy Sowden, Vivian De Los Santos, Mark Hodges** and **Mary Crouch** for arranging it all.

Photos by **Dave Thomas**



Is a New Solar Cycle Beginning?

Dec. 14, 2007: The solar physics community is abuzz this week. No, there haven't been any great eruptions or solar storms. The source of the excitement is a modest knot of magnetism that popped over the sun's eastern limb on Dec. 11th, pictured below in a pair of images from the orbiting Solar and Heliospheric Observatory (SOHO).

It may not look like much, but "this patch of magnetism could be a sign of the next solar cycle," says solar physicist David Hathaway of the Marshall Space Flight Center.

The new high-latitude active re-

gion is magnetically reversed, marking it as a harbinger of a new solar cycle.

For more than a year, the sun has been experiencing a lull in activity, marking the end of Solar Cycle 23, which peaked with many furious storms in 2000--2003. "Solar minimum is upon us," he says.

The big question now is, when will the *next* solar cycle begin?

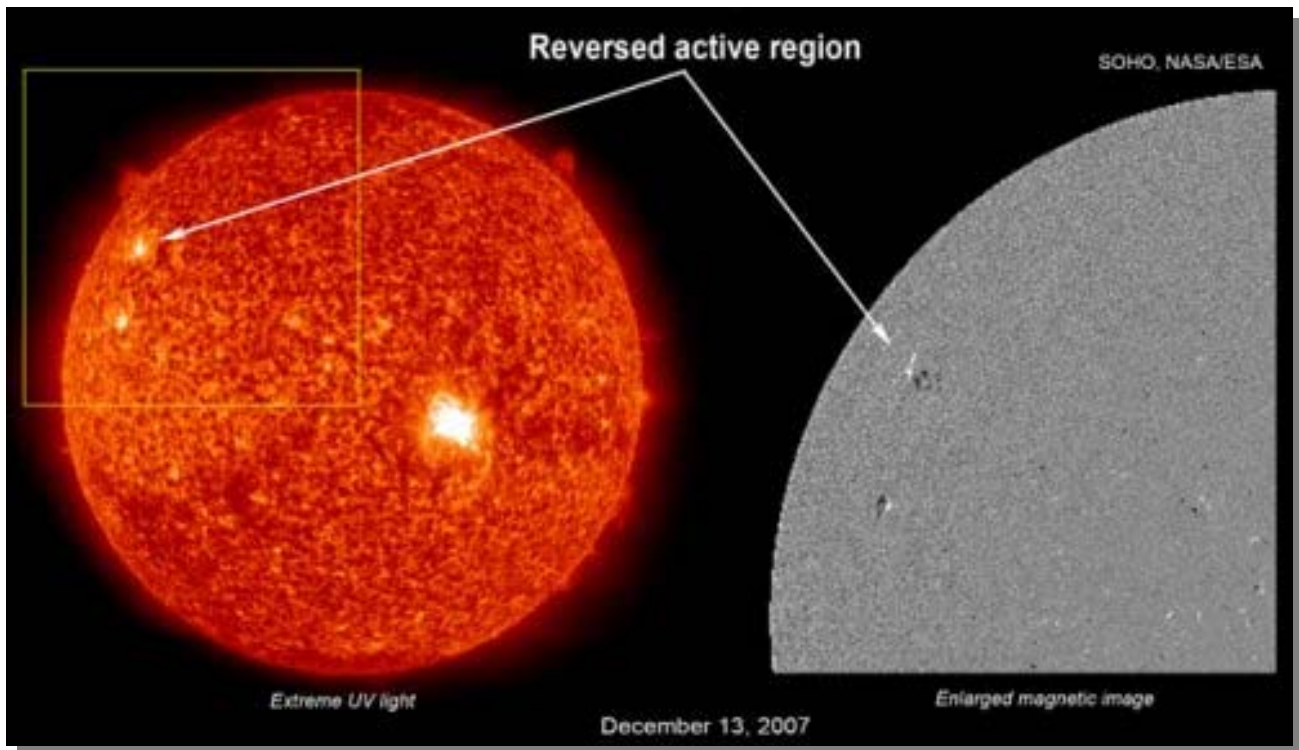
It could be starting now.

"New solar cycles always begin with a high-latitude, reversed polarity sunspot," explains Hathaway. "Reversed polarity " means a sunspot with opposite magnetic

polarity compared to sunspots from the previous solar cycle. "High-latitude" refers to the sun's grid of latitude and longitude. Old cycle spots congregate near the sun's equator. New cycle spots appear higher, around 25 or 30 degrees latitude.

The region that appeared on Dec. 11th fits both these criteria. It is high latitude (24 degrees N) and magnetically reversed. Just one problem: *There is no sunspot.* So far the region is just a bright knot of magnetic fields. If, however, these fields coalesce into a dark sunspot, scientists are ready to announce

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Above: From SOHO, a UV-wavelength image of the sun and a map showing positive (white) and negative (black) magnetic polarities.

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that Solar Cycle 24 has officially begun.

Many forecasters believe Solar Cycle 24 will be big and intense. Peaking in 2011 or 2012, the cycle to come could have significant impacts on telecommunications, air traffic, power grids and GPS systems. (And

don't forget the Northern Lights!) In this age of satellites and cell phones, the next solar cycle could make itself felt as never before.

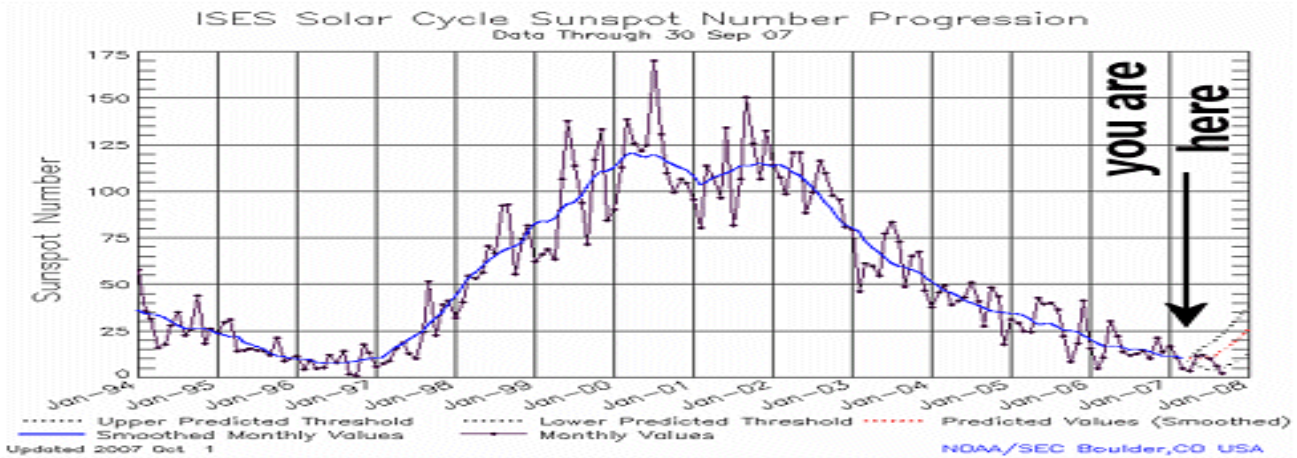
The furious storms won't start right away, however. Solar cycles usually take a few years to build to a frenzy and Cycle 24 will be no exception. "We still

have some quiet times ahead," says Hathaway.

Meanwhile, all eyes are on a promising little active region. Will it become the first sunspot of a new solar cycle? Stay tuned for updates from Science@NASA.

Author:
[Dr. Tony Phillips](#)

Below: Solar Cycle 23 is coming to an end. What's next? Image credit: NOAA/Space Weather Prediction Center.



Editors note: A new, magnetically reversed, sun spot appeared on January 5, 2008 at 30 degrees North latitude on the Sun. This seems to verify that the new solar cycle is beginning.

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neo.jpl.nasa.gov/.

An audio interview/podcast regarding 2007 WD5 is available at: <http://www.jpl.nasa.gov/multimedia/podcast/mars-asteroid-20071221/>

A videofile related to this story is available on NASA TV and the Web. For information and schedules, visit: <http://www.nasa.gov/ntv>.

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cleared, plainly revealing the target. Everything was a "go!"

At 12:10:01.1, the star winked out. I called out "start!" Tick, tick, tick, tick, tick — still a clear field — tick, tick, tick. At 9.5 seconds after 12:10, it popped into view. I blurted "stop!" Tick, tick, tick, tick, tick. Thin clouds returned, dimming the star. No matter though, I had a positive obser-

vation! Lamberta's shadow passed and, most assuredly, not many saw this stellar eclipse.

One last look revealed a few blurry glows in a field of thick mist. The clouds were here and were going to stay for awhile.

For information on participating in a nationwide asteroid occultation timing event, please go to the website of the International Occultation Timing Association (IOTA): <http://www.occultations.org>

Roanoke Valley Astronomical Society
3578 Berry Hill Drive
Roanoke, VA 24018

MONTHLY MEETING: Monday, January 21st, 7:30 p.m., Fifth Floor Meeting Room, Center in the Square, Roanoke. The program for the evening is: "Telescopes, Form and Function".

"MEMBERS ONLY" WEEKEND OBSERVING SESSIONS: Unless otherwise noted, observing sessions are held at Cahas Mountain Overlook, milepost 139 on the Blue Ridge Parkway.

-- **Friday and Saturday, 4th and 5th.** Sunset is at 5:16 p.m. Astronomical twilight ends at 6:49 p.m. The Moon sets at 1:55 and 2:38 p.m., respectively.

-- **Friday and Saturday, 25th and 26th.** Sunset is at 5:37 p.m. Astronomical twilight ends at 7:07 p.m. The Moon rises at 9:11 and 10:13 p.m., respectively.

-- **February Sessions:** 1st and 2nd; 8th and 9th; 29th and (March) 1st.

RVAS EXECUTIVE COMMITTEE MEETING: To be announced.