



# The Mason-Dixon Astronomer

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## Star Points for October 2011

“Space Junk”

by Curtis Roelle

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Several years ago on a warm summer night in June, I was at Piney Run Nature Center in Eldersburg. The Westminster Astronomical Society was armed with telescopes for a public star party. The night was clear and the time was a few minutes before 11 p.m.

I was talking with my friend, Richard. We were facing each other when he suddenly asked, “could you turn around and tell me what you think that is?” Turning around I saw three slowly moving glowing trails low in the northern sky traveling from left to right. The brightest object was glowing bright orange and leading the other two. The faintest was also the slowest, trailing the other two. It soon faded from view.

The two remaining objects continued across the sky while fading at the same time. The color changed to blue, then gray, and then they disappeared behind a tree. I didn't see the termination of flight, but it must have been spectacular. I could hear the gasps of others who continued watching the amazing scene.

We suspected that it might have been a piece of returning space junk instead of a meteor. Meteoroid particles typically travel on the order of 10 to 40 miles per second with respect to the Earth. Their smashing trips into the atmosphere usually last mere seconds at most. By comparison, space vehicles are slower moving, traveling at around five miles per second. The objects observed at Piney Run were moving much slower than a meteor.

In the following days, news reports announced that it had been a re-entering Russian rocket booster. The rocket had been launched 12 years earlier and had silently bided its time orbiting Earth ever since. It had re-entered and burned up in Earth's atmosphere somewhere between Maryland and Ontario, Canada (Canadian observers watched it in their southern sky).

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**October Meeting:** Wednesday, October 12, 2011, 7:30 p.m., Bear Branch Nature Center

**Speaker:** Dr. Rommel Miranda of Towson University will present “Deep Impact: The Influence of Astronomer-Educator Partnerships on Urban Middle School Students' Science Learner Characteristics.” See a description on page 3.

**Next WASI Observing Weekend:** Friday and Saturday, October 21 and 22, 2011

## Star Points *continued*

The United States Strategic Command catalogs and tracks objects four inches across and larger in Earth orbit. According to Air Force Space Command's professional journal **High Frontier**, as of last February there were 1,100 active satellites and 21,000 pieces of debris orbiting Earth. As indicated in the opening paragraphs above, inactive derelict debris can be as large as a rocket booster. These objects are tracked from the ground using telescopes, radar, and computers. In addition the Maryland-built MSX satellite, developed at The Johns Hopkins University's Applied Physics Laboratory, tracks space junk from Earth orbit.

Last month a deactivated NASA satellite launched 20 years earlier in 1991 was making news. The 6.5-ton Upper Atmospheric Research Satellite (UARS) was dead hurtling weight looping around the Earth 16 times a day. Drag from the few air molecules at the UARS' orbital height was pulling it down and soon it would plunge through the atmosphere in an uncontrolled reentry. Although most of the spacecraft would burn up in the atmosphere, the largest pieces, weighing several hundred pounds, were expected to survive and make it to Earth's surface over an area including six out of seven continents.

Using software and data available on the Internet, I calculated the final passes UARS would make over our area during its last hours (send an email for technical details, if interested). Each pass was very low in the sky, skimming the horizon, with the satellite, in the shadow of the Earth, not directly visible. But if it happened to re-enter and burn up while above our horizon in the sky, it would have been spectacular. So I was prepared to observe and to photograph it. Unfortunately, our skies were either cloudy or foggy on each of the three passes. Yet fortunately, UARS apparently reentered harmlessly over the Pacific Ocean.

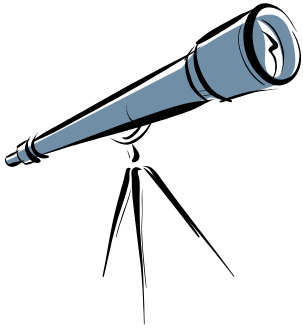
It wasn't the first abandoned piece of unused space hardware to crash to Earth, and it certainly won't be the last. The 85-ton U.S. Skylab space station, having been abandoned years earlier, crash-landed in Australia in 1979. Salyut 7, a space station belonging to the Soviet Union, reentered in 1991, its parts raining over Argentina. A Soviet spy satellite crashed in Canada in 1978. Radiation from its reactor was spread over a wide area. Another nuclear-powered Soviet satellite crashed to Earth in 1983.

No human has ever been injured by falling man-made space debris.

*"Star Points" by Curtis Roelle appears in the Carroll County Times on the first Sunday of each month. Visit the website at <http://www.starpoints.org> or send email to [StarPoints@gmail.com](mailto:StarPoints@gmail.com).*

*There is no president's message for this month.*

## Upcoming Events



**Soldiers Delight Public Stargazing** October 8, 8 p.m., at Soldiers Delight Natural Environment Area in Owings Mills

**International Observe the Moon Night** October 8, everywhere; for more info visit <http://observethemoonnight.org>

**Monthly WASI Meeting** October 12, 7:30 p.m., at Bear Branch Nature Center (BBNC)

**WASI Member Observing Weekend** October 21 & 22 at BBNC

**Mason-Dixon Fall Star Party** October 28 – 30 (postponed from September 30 – October 2), at the Footlight Ranch in Wellsville, Pennsylvania; for more info visit <http://www.masondixonstarparty.org>

**Air & Scare at National Air & Space Museum's Udvar-Hazy Center** October 29, 2 – 8 p.m. in Chantilly, Virginia; contact Skip to help out, and for more information see page 4 or <http://www.nasm.si.edu/events/>

**Planetarium Show** November 4, 7:30 p.m., at BBNC

## OCTOBER MEETING PROGRAM

Dr. Rommel J. Miranda is an Assistant Professor of Science Education in the Department of Physics, Astronomy & Geosciences at Towson University. He directs the Blinded by the Light: Urban K-12 Portable Planetarium Outreach program, and co-directs Towson University's contribution to Project ASTRO in the Baltimore City Public School System. He also serves as the evaluator for the NASA-funded Baltimore Excellence in STEM Teaching (BEST) Project.

Dr. Miranda will be presenting “Deep Impact: The Influence of Astronomer-Educator Partnerships on Urban Middle School Students’ Science Learner Characteristics.” This qualitative study investigates urban middle school teachers’ beliefs about their students’ ability to succeed in science, and the extent to which those beliefs were influenced by their partnerships with amateur or professional astronomers.

Please join Dr. Miranda for dinner before the meeting at Harry’s Main Street Grill in Westminster at 6 p.m.

## **Volunteers Wanted for Annual Air & Scare Family Night at NASM Udvar-Hazy Center**

It's that time of year again, and we are planning for another Spooktacular Air & Scare Family Night at the National Air and Space Museum Udvar-Hazy Center. This year's program will be Saturday, October 29th from 2:00 p.m. - 8:00 p.m., and I wanted to extend an invitation to anyone who might be interested in joining us to host a hands-on activity or presentation. Last year we had 35,000 visitors participate and it was phenomenal.

This year visitors will learn about animal flight and rats in space, and they will see some amazing tricks by roving magicians as we continue unlocking the mysteries of the universe. There's always something for everyone with a little Halloween twist. Returning favorites will include shows by the Beale Street Puppets, face painters, a professional storyteller, Star Wars characters, R2D2 robots, Ghostbusters, and mysterious artifact-based stories told by the museum's curators and docents, and of course, everyone's favorite, the candy/treat stations throughout the museum.

The museum will again offer a light dinner and refreshments as a courtesy for everyone hosting hands-on activities and for donating your invaluable time and expertise to this exciting educational event. Also, the \$15 parking fee will be waived for all of staff and activity hosts/presenters. Any time you have is always appreciated.

Please contact Skip Bird for more info and to volunteer.

Skip

*Welcome, New WASI Member!*

WASI extends a warm welcome to the following new member.

**Elizabeth Reimer** of Taneytown, Maryland

## Minutes of Meeting on September 14, 2011

Meeting called to order at 7:40 by Skip.

Various announcements (Skip)

An appointment to get final approval of observatory plans (changes) is scheduled.

The Maryland Science Center has asked if we could set up outside the museum on Friday nights to publicize their free public viewing at the museum's observatory.

Outreach report (Skip)

Air and Scare will occur at Dulles in late October (October 29, 2 to 8 PM according to the Smithsonian web page). Note: If you intend to help out with this, let Skip know early so you get on the list. Otherwise you will have to pay \$15 parking.

There were a few observation reports and comments regarding the weather.

There are 2 new members.

Curt showed slides of the WASI picnic and of Tom Rehn's site in West Virginia, including photos of dark nebulae.

It was announced that there will be a planetarium show on Friday.

Meeting adjourned at 9:05 PM.

Respectfully submitted,

Robert L. Clark



## Dark Clues to the Universe

By Dr. Marc Rayman

Urban astronomers are always wishing for darker skies. But that complaint is due to light from Earth. What about the light coming from the night sky itself? When you think about it, why is the sky dark at all?

Of course, space appears dark at night because that is when our side of Earth faces away from the Sun. But what about all those other suns? Our own Milky Way Galaxy contains over 200 billion stars, and the entire universe probably contains over 100 billion galaxies. You might suppose that that many stars would light up the night like daytime!

Until the 20th century, astronomers didn't think it was even possible to count all the stars in the universe. They thought the universe was infinite and unchanging.

Besides being very hard to imagine, the trouble with an infinite universe is that no matter where you look in the night sky, you should see a star. Stars should overlap each other in the sky like tree trunks in the middle of a very thick forest. But, if this were the case, the sky would be blazing with light. This problem greatly troubled astronomers and became known as "Olbers' Paradox" after the 19<sup>th</sup> century astronomer Heinrich Olbers who wrote about it, although he was not the first to raise this astronomical mystery.

To try to explain the paradox, some 19th century scientists thought that dust clouds between the stars must be absorbing a lot of the starlight so it wouldn't shine through to us. But later scientists realized that the dust itself would absorb so much energy from the starlight that eventually it would glow as hot and bright as the stars themselves.

Astronomers now realize that the universe is not infinite. A finite universe — that is, a universe of limited size — even one with trillions of stars, just wouldn't have enough stars to light up all of space.

Although the idea of a finite universe explains why Earth's sky is dark at night, other factors work to make it even darker.

The universe is expanding. As a result, the light that leaves a distant galaxy today will have much farther to travel to our eyes than the light that left it a million years ago or even one year ago. That means the amount of light energy reaching us from distant stars dwindles all the time. And the farther away the star, the less bright it will look to us.

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Also, because space is expanding, the wavelengths of the light passing through it are expanding. Thus, the farther the light has traveled, the more red-shifted (and lower in energy) it becomes, perhaps redshifting right out of the visible range. So, even darker skies prevail.

The universe, both finite in size and finite in age, is full of wonderful sights. See some bright, beautiful images of faraway galaxies against the blackness of space at the Space Place image galleries. Visit <http://spaceplace.nasa.gov/search/?q=gallery>.

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*



*This Hubble Space Telescope image of galaxy NGC 4414 was used to help calculate the expansion rate of the universe. The galaxy is about 60 million light-years away. Credit: NASA and The Hubble Heritage Team (STScI/AURA)*