

Lunar Librarian Newsletter

November 2006

Vol. 1. Issue. 5

LRO News

In a Flash of Light...

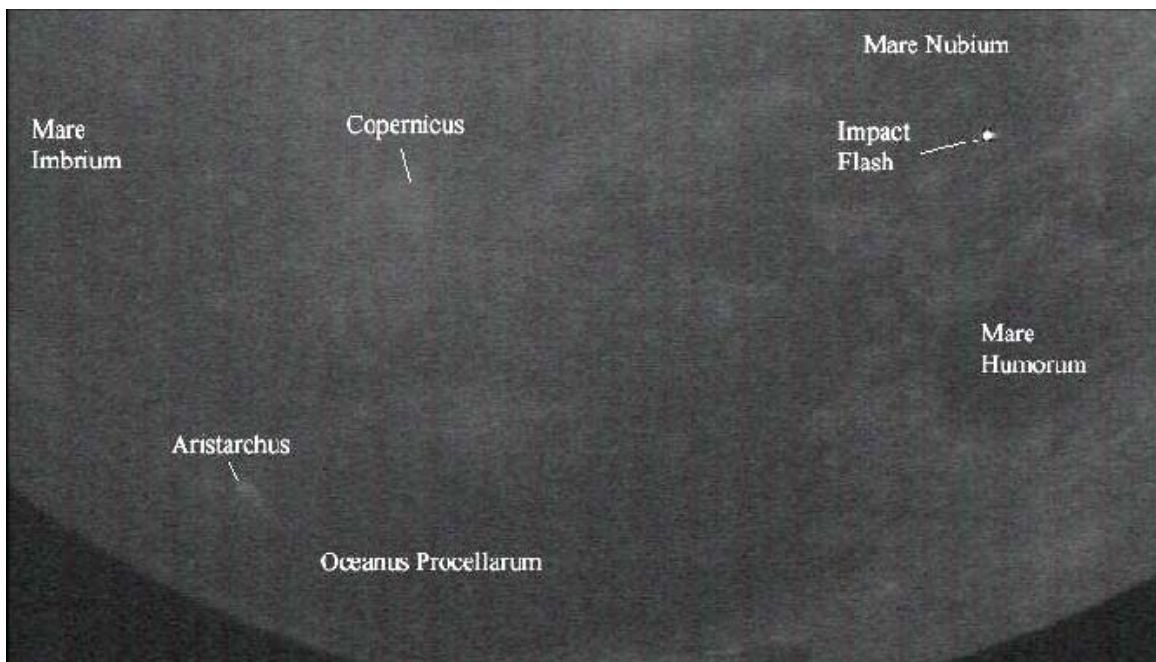
What would a meteor impact look like from Earth? On May 8, 2006, Heather McNamara and Danielle Moser, both engineers from Marshall Space Flight Center, caught a meteoroid impacting the Moon on film. It appeared as a bright fireball that lasted only four-tenths of a second. The result of this impact was a crater 14 meters wide and 3 meters deep. Bill Cooke, the head of NASA's Meteoroid Environment Office in Huntsville, AL, described the energy of this impact as "17 billion joules of kinetic energy--that's about the same as 4 tons of TNT." By analyzing the duration and brightness of the flash, Cooke estimated that the original meteoroid to be about 10 inches (25 cm) wide and traveling approximately 85,000 mph (38 km/s).

Would this size meteorite affect us here on Earth? The answer is no. It would probably never reach the ground due to the Earth's atmosphere. The atmosphere would cause a 10-inch meteoroid to disintegrate. What one would see is a spectacular fireball in the sky.

Unfortunately, the Moon does not have an atmosphere to protect astronauts and lunar bases. This will pose a problem for future explorers on the Moon. No matter what the size of the meteoroid, when an impact occurs, there will be an explosion as well as spraying of debris. Currently, work is being done to observe how many meteoroids hit the Moon. Observations estimate the Moon is hit as much as ten times a month.

For footage of the actual meteor impact, please visit:

http://www.nasa.gov/vision/universe/solarsystem/13jun_lunarsporadic.html



Concept Studies for Possible future Discovery Program Missions

Late last month, NASA selected a total of six out of approximately two dozen proposals for concept studies as part of the NASA's Discovery Program 2006 Announcement of Opportunity. The proposals fell into one of two categories. The first is for "complete missions to design, build and fly new spacecraft to accomplish specific planetary science objectives." The second set of proposals is for "missions of opportunity that propose scientific uses for existing spacecraft or build instrumentation for spacecraft of other space agencies." Scientists and engineers at Goddard Space Flight Center in Greenbelt, Maryland will be involved in several of the winning proposals.

Each of the winning proposals will receive an award to conduct a concept study. New missions will receive \$1.2 million while missions of opportunities will only receive \$250,000. After the concept study is completed, one or more of these projects may be selected by NASA to be developed into a mission. In either type of mission, new or opportunity, each project "must complete its mission, including archiving and analyzing data" for less than a set amount, \$425 million and \$35 million respectively.

The missions selected for concept studies are:

Three missions were selected for concept studies:

- The Origins Spectral Interpretation, Resource Identification and Security (OSIRIS) mission would survey an asteroid and provide the first return of asteroid surface material samples to Earth. Michael Drake of the University of Arizona, Tucson, is OSIRIS's principal investigator. NASA's Goddard Space Flight Center, Greenbelt, MD, would manage the project.
- The Vesper mission is a Venus chemistry and dynamics orbiter that would advance our knowledge of the planet's atmospheric composition and dynamics. Gordon Chin of Goddard is Vesper's principal investigator. Goddard would manage the project.
- The Gravity Recovery and Interior Laboratory (GRAIL) mission would use high-quality gravity field mapping of the moon to determine the moon's interior structure. Maria Zuber of the Massachusetts Institute of Technology, Cambridge, Mass., is GRAIL's principal investigator. NASA's Jet Propulsion Laboratory, Pasadena, CA, would manage the project.

The three missions of opportunity selected for concept studies are:

- The Deep Impact eXtended Investigation of Comets (DIXI) mission would use the existing Deep Impact spacecraft for an extended flyby mission to a second comet to take pictures of its nucleus to increase our understanding of the diversity of comets. Michael A'Hearn of the University of Maryland, College Park, MD, is DIXI's principal investigator.
- The Extrasolar Planet Observations and Characterization (EPOCh) mission would use the high-resolution camera on the Deep Impact spacecraft to search for the first Earth-sized planets detected around other stars. L. Drake Deming of Goddard is EPOCh's principal investigator.
- The Stardust NEXt mission would use the existing Stardust spacecraft to flyby comet Tempel 1 and observe changes since the Deep Impact mission visited it in 2005. In 2005, Tempel 1 has made its closest approach to the sun, possibly changing the surface of the comet. Joseph Veverka of Cornell University, Ithaca, NY, is NEXt's principal investigator.

For more information please see: <http://discovery.nasa.gov/> and http://discoverynewfrontiers.nasa.gov/news/Discovery/2006/news_103006.html

Science News



NASA Science News has published several articles last month. Please follow the links to read the full stories.

A Growing Intelligence around Earth

A satellite orbiting Earth is learning to think for itself. This artificial intelligence offers a powerful new way to study Earth, and it may prove useful on other planets, too.

http://science.nasa.gov/headlines/y2006/26oct_sensorweb.htm?list907815

Sci-fi Life Support

Researchers are putting the finishing touches on a new life support system for the ISS that seems to come right out of the pages of science fiction.

http://science.nasa.gov/headlines/y2006/30oct_eclss.htm?list907815

Fantastic Images of the Sun

A new space telescope onboard Japan's Hinode spacecraft is beaming back some fantastic images of the Sun. http://science.nasa.gov/headlines/y2006/02nov_firstlight.htm?list90781

Bizarre Lunar Orbits

Mysterious concentrations of mass in the Moon's ancient lava seas disturb the orbits of Moon-circling spacecraft. NASA is taking these "mascons" into account as the agency prepares to return to the Moon.

http://science.nasa.gov/headlines/y2006/06nov_loworbit.htm?list907815

Is the Moon Still Alive?

Conventional wisdom says the Moon is dead. Conventional wisdom may be wrong. Today in the journal Nature, a team of NASA-supported scientists announced evidence for fresh geologic activity on the Moon.

http://science.nasa.gov/headlines/y2006/09nov_moonalive.htm?list907815

Return of the Leonids

Earth is heading for a cloud of comet dust that could produce an outburst of Leonid meteors on Nov. 19th.

http://science.nasa.gov/headlines/y2006/14nov_leonids.htm?list907815

Horseshoe Crabs Give Blood for Space Travel

Soon, astronauts onboard the ISS will test a high-tech medical device that uses primitive enzymes from horseshoe crabs to diagnose human illness.

http://science.nasa.gov/headlines/y2006/16nov_locad.htm?list907815

The X-ray Transit of Mercury

Using a high-resolution X-ray telescope, Japan's new Hinode spacecraft captured some unique and beautiful images of last week's Transit of Mercury.

http://science.nasa.gov/headlines/y2006/17nov_xraytransit.htm?list907815

Thanksgiving Skies

Flying somewhere for Thanksgiving? Think of it as a sky watching opportunity. There are some things you can see only through the window of an airplane.

http://science.nasa.gov/headlines/y2006/21nov_thanksgivingskies.htm?list907815

Librarian News

Here's what's going with some of the librarians who participated in the workshops

Delaware:

Karen Johnson from the Bridgeville Public Library in Bridgeville Delaware had a program called the Harvest Moon celebration. Some of the activities included fun facts about the Moon, matching game, presentation on the LRO mission and simulating craters with flour and coco. The celebration concluded with watching the night sky.

Congratulations Karen on a successful program!

What's going on at your library??

Email Heather, heather_weir@ssaihq.com, with your library's space program activities by December 10th, and it will be included in the next Lunar Librarian Newsletter. Feel free to send along pictures from your workshops.

Did you know?? Where can I find??

Are you planning a Moon program for the summer of 2007? Will you need speakers?

As you begin to plan your summer programs, please keep us informed about your lunar activities. We have heard from a few librarians who are interested in having scientists speak at their activities. It would be most helpful if you could drop us an email with your request for speakers as well as a tentative schedule of events. This will allow us to find someone who will best fit your criteria and we may be able to make suggestions as to other activities. The earlier you could let us know about your plans, the sooner we can see if we can coordinate with scientists. Please feel free to contact either Brooke Carter (brooke_carter@ssaihq.com 301-867-2112) or Heather Weir (heather_weir@ssaihq.com 301-867-2083) with details on what you are looking for and what you want to cover.

Monthly Lunar Activity

As the hubbub continues as to whether or not Pluto is a planet or should be reclassified as a ‘dwarf planet’, here is an activity that still has Pluto as a planet. For more information and the New Horizons P-I perspective on this ongoing question, please visit:

http://pluto.jhuapl.edu/overview/piPerspectives/piPerspective_09_06_2006.php

Solar System Scale Activity

By Pam Whiffen

* Sentence strip or strip of paper (length not important)

* Pencil

1. Write “Sun” on one end of the strip and “Pluto” on the other. Encourage kids to use small print for the Sun and NO circles to depict it – only letters. Use your strip vertically with Sun at the top and Pluto on the bottom.
2. Fold strip in half and open up showing the creases. Ask students what they think is in the middle of our Solar System. Is there a planet? Maybe there isn’t an object there. Ask what other astronomical objects make up our Solar System. Usually kids will respond with the order of the planets – My very elegant mother just served us nine pizzas... Sometimes kids will mention the Asteroid Belt. Depending on your class, you can use the opportunity to have students guide you to write M, V, E, M, J, S, U, N, P on the board as a reminder.
3. Have students write the name of the object in the crease if they think there is one. I sometimes collect a few strips and tape them to the board then we, as a class, take a vote on which one they think is accurate. Next, I reveal the answer and hand back the strips. We congratulate any “brainiacs.”
4. Then, ask them what they think you are going to ask them to do next. Yep, write the planets in order and in their relative distance from each other down the strip of paper.
5. After they have completed their strips have them turn it over and make their “answer key” so they can see how close they came.

To make key:

1. Turn strip over and refold halfway between the Sun and Pluto. Write Uranus.
2. Fold Pluto to Uranus. Write Neptune.
3. Fold Sun to Neptune. Write Saturn.
4. Fold Sun to Saturn. Write Jupiter.
5. Fold Sun to Jupiter. Write No Planet or Asteroid Belt.
6. Fold Sun to Asteroid Belt. Write Mars.
7. Fold Sun to Mars. Write Venus.
8. Write in Mercury in between Sun and Venus.
9. Ask students which planet is missing. Write in Earth in between Venus and Mars.

*** Now students can compare their strips with the key and see how they did. I also give them a homework assignment to show their parents the activity by having them guess also before teaching them by showing the key side. Parents sign the strip to show they attempted it.