



Lunar Librarian Newsletter

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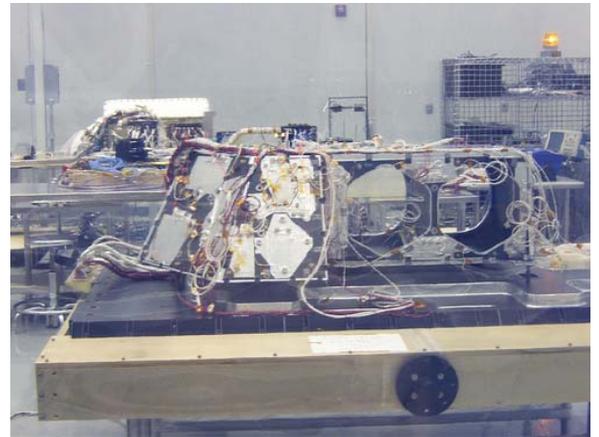


LRO News

LRO's assembly in the 'White House'



The reactions wheels, to the left, that will keep LRO stable in orbit have been integrated into one of the panels of the spacecraft bus.



The instrument module, to the right, holds the various LRO instruments including the cameras, laser altimeter and the Star trackers

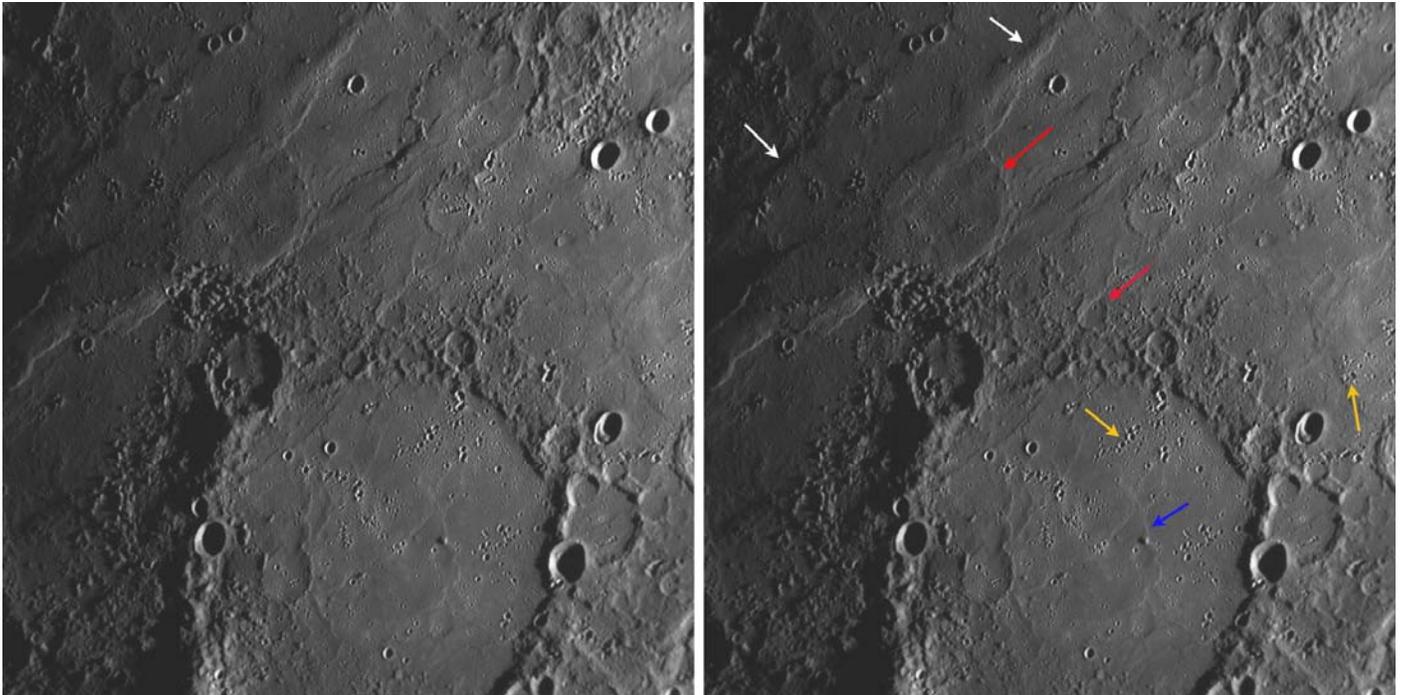


Al Lacks performs the incoming inspection of the Telemetry, Tracking, and Command subsystem.

The LRO team continues to make good progress with the integration of the Orbiter. The Gimbal Control Electronics and the Propulsion & Deployment Electronics are electrically integrated with the system, and we have run their functional tests. We installed and connected the Miniature Inertial Measurement Unit (MIMU). The MIMU senses spacecraft motion, and the Orbiter uses that information to precisely control the spacecraft's pointing. The MIMU is so sensitive that it can detect the rotation rate of the Earth - we use that measurement to verify proper performance of the unit. We are also integrating the Telemetry, Tracking, and Command (TT&C) subsystem. The TT&C provides radio communication with the ground, and we will use measurements of the radio signals to provide

information critical to the tracking of the Orbiter.

Images from MESSENGER's First Flyby of Mercury



MESSENGER's Narrow Angle Camera (NAC) of the Mercury Dual Imaging System (MDIS) captured this image during the flyby one month ago. The Sun is illuminating this region at a low angle, accentuating the modest ridges and other low topography on these nearly flat plains. Low ridges trend from the top-center of the image to the left edge (**white arrows**). The ghostly remains of craters are visible, filled to their rims by what may have been volcanic lavas (**red arrows**). The faint remnant of an inner ring within the large crater in the bottom half of this picture can be seen (**blue arrow**); the area interior to this ring was also flooded, possibly by lava, nearly to the point of disappearance. Clusters of secondary craters on the floor of the large crater and elsewhere (**yellow arrows**) formed when clumps of material were ejected from large impacts beyond the view of this image, which is about 350 kilometers (220 miles) across.

http://messenger.jhuapl.edu/gallery/sciencePhotos/image.php?gallery_id=2&image_id=161

Cassini at Saturn Interactive Explorer (CASSIE)

Ever wonder where Cassini is? NASA's Jet Propulsion Laboratory created an interactive 3-D program using actual Cassini data. This interactive program shows exactly where the Cassini spacecraft is and what it is doing. Users can see how Cassini orbits Saturn and its moons as well as how it maneuvers according to the received instructions from mission scientists.



CASSIE consists of three different windows:

(WINDOW 1) The "Where is Cassini Now?" expedition shows exactly where the Cassini spacecraft is, and what it is doing each moment over a 24-hour period in real time. Viewers can see the spacecraft move along its course and maneuver according to instructions from mission scientists and navigators.

(WINDOW 2) The "Mission Overview" expedition shows the spacecraft as it orbits the Saturn system over the last 3.5 years and fast-forward into the future to see where it is going. Users can switch between two camera angles to see Cassini fly by Saturn and its moons.

(WINDOW 3) The "Saturn's Moons" expedition gives an in-depth peek at seven of Saturn's moons, providing useful facts and interactive surface views of each moon. The text description of these moons is also available here.

To download this interactive program, please visit:

http://www.nasa.gov/mission_pages/cassini/multimedia/cassie.html or
<http://saturn.jpl.nasa.gov/multimedia/CASSIE>.

Educational Material from NASA

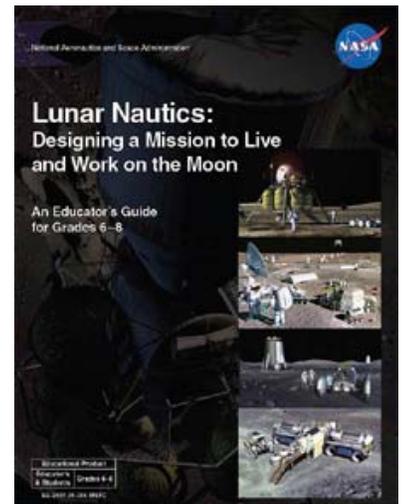
Lunar Nautics: Designing a Mission to Live and Work on the Moon Educator Guide

The Lunar Nautics Educator Guide has 40 activities. Students assume roles of workers at Lunar Nautics Space Systems, Inc., a fictional aerospace company specializing in mission management, lunar habitat and exploration design, and scientific research.

This guide features lessons that address the basics of Newton's Laws of Motion, rocket design, microgravity, and the moon. Students will design, test and analyze a model lunar lander, a robot, and a soda bottle rocket. Other activities include building edible models of spacecraft and a solar oven to cook hot dogs. Students can also build a microgravity sled as part of an underwater activity.

Educators can use this guide in a variety of settings or formats, such as week-long day camps, after-school programs, a classroom unit or as supporting curriculum.

The Student Employment Handbook supplements the Lunar Nautics Educator Guide. The handbook contains the student sheets that accompany the lessons and activities in the educator guide.



<http://www.nasa.gov/education/lunarnaautics>

- Lunar Nautics Educator Guide [3MB PDF file]
(http://www.nasa.gov/pdf/200173main_Lunar_Nautics_Guide.pdf)
- Lunar Nautics Student Employment Handbook [2MB PDF file] (For grades 6-8)
(http://www.nasa.gov/pdf/200225main_Lunar_Nautics_Student_Handbook.pdf)

Science News



NASA Science News has published several articles last month. Please follow the links to read the full stories. Check out our RSS feed at <http://science.nasa.gov/rss.xml>!

Friday Morning Sky Show: Venus and Jupiter Converge

The two brightest planets are converging for a beautiful close encounter on Friday morning, February 1st. It's a sky show you won't want to miss.

http://science.nasa.gov/headlines/y2008/29jan_venusjupiter.htm?list907815

Surprises from Mercury

NASA's MESSENGER spacecraft has beamed back some surprising new data from the planet Mercury. Highlights include a weird crater nicknamed "the Spider," a planetary tail of hydrogen atoms, and measurements that show giant Caloris basin is even bigger than researchers imagined.

http://science.nasa.gov/headlines/y2008/30jan_mercurysurprise.htm?list907815

Extremophile Hunt Begins

A team of scientists has just set off to explore a strange lake in Antarctica, which may be home to exotic forms of microscopic life. http://science.nasa.gov/headlines/y2008/07feb_cloroxlake.htm?list907815

Name that Space Telescope!

Would you like to name the next great space telescope? Here's your chance: NASA is inviting members of the general public to suggest a new name for the Gamma-ray Large Area Space Telescope before it launches in mid-2008. http://science.nasa.gov/headlines/y2008/08feb_namehattelescope.htm?list907815

Total Lunar Eclipse

On Wednesday evening, February 20th, the full Moon over the Americas will turn a delightful shade of red and possibly turquoise, too. It's a total lunar eclipse—the last one until Dec. 2010.

http://science.nasa.gov/headlines/y2008/13feb_lunareclipse.htm?list907815

Who's Orbiting the Moon?

Do you know who's orbiting the moon? The answer might surprise you.

http://science.nasa.gov/headlines/y2008/20feb_orbitingthemoon.htm?list907815



Librarian News

LRO Librarian Workshop at Ames

by Brooke Carter



The fifth installment of the "Explore! To the Moon and Beyond" was held on January 31 and February 1, 2008 at NASA Ames Research Center. A total of 32 people from California libraries participated in activities about LRO from Explore! To the Moon and Beyond. During the workshop, participants were given an overview of the LRO mission, including the goals and objectives of the mission and the instruments aboard the spacecraft. The presentations were interspersed with activities designed to get the participants thinking about how scientists investigate the

surface of the Moon from a distance. Many of the California participants were planning on sharing the activities with other libraries in their district.

In addition to the LRO activities at this workshop, participants were treated to a preview of the activities that have been developed by the LCROSS education and public outreach team. Brian Day, LCROSS E/PO lead, along with his team, demonstrated how to make high-velocity impact craters with a slingshot. The demonstration included a discussion of the Quest Challenge. Participants were also given an overview of the LCROSS mission, which is hitching a ride aboard LRO's Atlas V rocket at launch time, and will impact the Moon to help look for water ice near the lunar poles. One participant was particularly interested in having the Explore! To the Moon and Beyond materials translated into Spanish, so keep an eye out for these materials en Espanola! All in all, it was a great workshop, and we now have 32 new members to add to the LRO Education and Public Outreach team!



Explore Web Casts!

Interact with NASA scientists, learn about health challenges astronauts face, participate in fun activities to use in your library or after school programming, and register for a door prize drawing. Names will be drawn to receive \$200 vouchers and SkyTellers programs! All participants will receive a certificate of participation. Health in Space is two-parts, each 90 minutes.

- Part One - February 26th from 3:00-4:30 CST
- Part Two - March 4th from 3:00-4:30.

For more information and to sign up, contact bnelson@lpi.usra.edu. All you need is a telephone (speaker is best, but any phone will work) and an internet connection. The Web cast is Free!

Stay Tuned for Future International Polar Year Web Casts!

Did you know?

If you're looking for past issues of the Lunar Librarian Newsletter, look no farther. They can be found at <http://lunar.gsfc.nasa.gov/outreach.html>. Check out previous activities and what's been going on with other libraries.

Links of the Month...

- Map-a-Planet: Explore the Earth's Moon <http://www.mapaplanet.org/explorer/moon.html>
- SHOCKWAVES: ONE HUNDRED YEARS AFTER THE 1906 EARTHQUAKE. The catastrophe of the great 1906 San Francisco earthquake spurred a century of progress in earthquake science and engineering. This 46-minute award-winning film (and nominated for an Emmy) includes dramatic historical footage, colorful animations, and interviews with earthquake experts. <http://earthquake.usgs.gov/regional/nca/1906/shockwaves>
- Sunspot Activity, NOAA, - find resources relating to sunspot maximum and minimum activity 1610-present; annual numbers 1700-present; monthly numbers 1749-present; daily values 1818-present; and sunspot numbers by north and south hemisphere. The McNish-Lincoln sunspot prediction is also included. <http://www.ngdc.noaa.gov/stp/SOLAR/ftpsunspotnumber.html>
- Lunar eclipse FAQ sheet http://space.rice.edu/Eclipse/Lunar_Eclipse_FAQs.pdf

Monthly Activity

Cratering the Moon Challenge

Welcome to the Spring 2008 NASA Quest Challenge!

Help scientists at NASA find water on the lunar poles.



Just like on Earth, water is a crucial resource on the Moon. It will not be practical to transport to space the amount of water needed for human consumption and exploration. It is critical to find natural resources, such as water, on the Moon. The Lunar Crater Observation and Sensing Satellite (LCROSS) mission will begin the search for water, leveraging the information we learned from the Clementine (<http://quest.nasa.gov/lunar/lcross/clementine.htm>) and Lunar Prospector (<http://quest.nasa.gov/lunar/lcross/pro prospector.htm>) missions.

By going to the Moon for extended periods of time before other bodies in our solar system, astronauts will search for resources and learn how to work safely in a harsh environment—stepping stones to future exploration. The Moon also offers many clues about the time when the planets were formed.

Scientists at NASA Ames Research Center in Mountain View, California are developing a spacecraft they'll deliberately crash into the Moon as part of an attempt to find water. A second craft will fly through the lunar dust plume released from the crash and send data back to Earth for analysis. NASA plans to return astronauts to the Moon by 2018 as a stepping stone on the way to Mars. Because it's very expensive to launch materials into space (as much as \$15,000 per pound to the Moon), it would be a great advantage to astronauts to have a water supply already in place on the Moon. Two previous lunar missions -- Clementine in 1994 and Lunar Prospector in 1998 -- found indirect but not conclusive evidence of water. Your challenge will be to design a lunar impact simulator and determine the optimal impact angle to give us the most information from the crash.

See the calendar below (<http://quest.nasa.gov/challenges/lcross/index.html#calendar>) for planning purposes. Prepare for the Challenge with some background references (<http://quest.nasa.gov/challenges/lcross/about.html>) to learn about some of the missions that have gone before. A Teachers' Guide will be available in MS Word and .pdf formats. To browse additional information about this mission and read news as it breaks, visit the main LCROSS site, <http://lcross.arc.nasa.gov>

Calendar of Events

<p>February 2008</p>	<p>Registration begins! http://www.surveymonkey.com/s.aspx?sm=YRL9P3EwDagN4FKxcA_2f7UA_3d_3d</p> <p>After you have registered for the HiRISE Image Targeting Challenge you will be receive an email giving you information on how to access the pre-challenge survey for you students. The pre-survey and post-survey help us to evaluate the impact of our challenges. We will also be requesting teacher evaluations at the end of the challenge.</p> <p>Note: If you have registered before February 12, and have not received an email welcoming you to the event, it could be that you entered your email incorrectly on the registration. Please send an email to Linda (mailto:Linda.B.Conrad@nasa.gov) so that we may correct our records.</p>
<p>Now!</p>	<p>Begin preparation, understanding:</p> <ul style="list-style-type: none"> • What the LCROSS mission is all about. • Why we are re-visiting this type of impact on the Moon. • What variables will determine the best, most controlable impactor? • What angle and other conditions would create the most usable scientific data <p>(Teacher Guides will be available online in MS Word and .pdf format when you have completed the pre-challenge survey.) See also links to other online resources for research purposes. http://quest.nasa.gov/challenges/lcross/about.html</p>
<p>March 5, 2008</p>  <p>10:00 a.m. Pacific Time</p>	<p>Opening Webcast: Meet team members and find out about the LCROSS project</p> <p>Begin your designs</p>
<p>Meet the Team PodCast One</p> 	<p>Meet the team.</p>
<p>Meet the Team PodCast Two</p> 	<p>Meet the team.</p>

<p>Late March</p>	<p>Submit your preliminary designs.</p> <p>Experts will evaluate and offer suggestions</p>
<p>Meet the Team PodCast Three</p> 	<p>Meet the team.</p>
<p>Meet the Team PodCast Four</p> 	<p>Meet the team.</p>
<p>Mid-Late April</p>	<p>Final design submissions</p>
<p>Late April/Early May Final Webcast:</p>  <p>Live Webcast!</p>	<p>Join us in this live webcast featuring expert comments on student designs. If you cannot make the hour of the webcast, place your questions in the chat room early. We will archive the webcast as soon as possible after the webcast.</p>
<p>May 2008</p>	<p>Post-Challenge Student Survey</p> <p>Teacher Reaction Survey</p>