



- News
  - Articles
  - Videos
  - Images
  - Books
  - Search
- 
- Health & Medicine
  - Mind & Brain
  - Plants & Animals
  - Earth & Climate
  - Space & Time
  - Matter & Energy
  - Computers & Math
  - Fossils & Ruins

**Science News**

[Share](#) [Blog](#) [Cite](#) [Print](#) [Email](#) [Bookmark](#)

**Professor Prepares For America's Return To The Moon**

ScienceDaily (June 17, 2009) — The Interdisciplinary A building on the Arizona State University Tempe campus looks rather average from the outside. There isn't anything that hints at the excitement, talent and innovation hidden behind its nondescript doors, and there is certainly no indication that the first steps of a great journey are taking place inside.

See also:

**Space & Time**

- [Moon](#)
- [Space Missions](#)
- [NASA](#)
- [Space Exploration](#)
- [Space Probes](#)
- [Mars](#)

**Reference**

- [Lunar space elevator](#)
- [Phoenix \(spacecraft\)](#)
- [Exploration of Mars](#)
- [Eclipse](#)

For nearly two years, professor Mark Robinson and his team have called this building home, developing it into a state-of-the-art Science Operations Center (referred to as the SOC) to work in conjunction with their contribution to the Lunar Reconnaissance Orbiter (LRO). The instrument payload of LRO consists of seven scientific instruments from institutions around the nation and globe that will return lunar imagery, topography, temperatures, and more. Robinson is Principal Investigator of one of the instruments on board, the imaging system known as LROC (short for Lunar Reconnaissance Orbiter Camera).

"LRO is the ever important first step in America's human return to the moon. We have much to learn as we restart exploring our nearest neighbor," says Robinson. "We are returning to the moon as humankind's first step in leaving planet Earth to explore the Solar System. Learning to live and work on the moon will allow us to build the skills and technologies to take the next steps to Mars, the asteroids, and beyond."

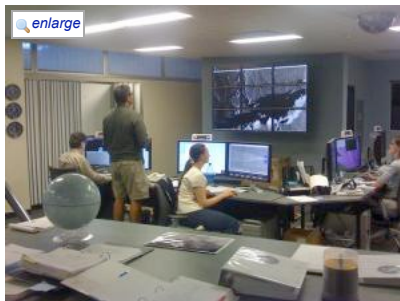
LRO is the first mission in NASA's Space Exploration policy, a plan to return to the moon and then to travel to Mars and beyond. Just as a scout finds the safest way for expeditions on Earth, LRO will act as a robotic scout to gather crucial data on the lunar environment that will help astronauts prepare for future lunar expeditions. The LROC imaging system serves the mission's primary objective of scouting for safe and compelling lunar landing sites.

LROC will retrieve high-resolution black and white images of the lunar surface, capturing images of the lunar poles with resolutions down to 1m, and will image the lunar surface in color and ultraviolet. The imaging system consists of two Narrow Angle Cameras (NACs) to provide high-resolution images, a Wide Angle Camera (WAC) to provide images in seven color bands over a 60-km swath, and a Sequence and Compressor System (SCS) supporting data acquisition for both cameras.

To give you an idea of the scale of resolution, the NAC gives us a resolution of 0.5 meters/pixel so you could recognize features the size of a car on the surface, but you wouldn't be able to read its license plate. Whereas the WAC provides a resolution of 100 meters/pixel in the visible spectrum, which means you could see images the size of a football field.

"We're collecting the data that will be used to determine where the first lunar outposts, and eventually settlements, will be located," says LROC scientist Samuel Lawrence, a postdoctoral fellow in the School of Earth and Space Exploration in ASU's College of Liberal Arts and Sciences.

The LROC facility is normally lively, filled with Robinson's team of scientists, staff, student researchers and instrument developers. But today, the building is unusually still and quiet. With launch only hours away, Robinson and a majority of his team are already awaiting liftoff from the viewing areas at Kennedy Space Center. The hustle and bustle of notebook-carrying students and researchers is gone, and in place of



Planetary scientist Mark Robinson leads a team of college researchers and grad students for this week's scheduled NASA launch of the Lunar Reconnaissance Orbiter. (Credit: Image courtesy of Arizona State University)

Ads by Google Advertise here

**China Solar Eclipse 2009**  
Private viewing location. Total solar eclipse tours China July 2009  
[Solar-Eclipse.OrientalTravel.co.uk](http://Solar-Eclipse.OrientalTravel.co.uk)

**"Six Sigma" Certified?**  
100% Online-Six Sigma Certificate From Villanova -Find Out More Now.  
[www.VillanovaU.com/SixSigma](http://www.VillanovaU.com/SixSigma)

**Buran May Be Revived**  
Soviet Shuttle Could Bail Out NASA Watch this story!  
[www.russiatoday.com](http://www.russiatoday.com)

**Rent A Moonwalk**  
Make Your Kids' Party A Lot Of Fun Give Them Lots Of Bouncing Fun!  
[www.JumpForFun.com/Moonwalks](http://www.JumpForFun.com/Moonwalks)

**Furniture Sale at Macy's**  
Find Casual, Modern & Classic Furniture at Macy's - Top Quality!  
[Macys.com/Furniture](http://Macys.com/Furniture)

**Related Stories**

**NASA Views Landing Site Through Eyes Of Future Moon Crew** (Feb. 28, 2008) — NASA has obtained the highest resolution terrain mapping to date of the moon's rugged south polar region, with a resolution to 20 meters per pixel. The imagery generated by the data has been ... [> read more](#)

**NASA Sets Sights On Lunar Dust Exploration Mission** (Apr. 13, 2008) — NASA is preparing to send a small spacecraft to the moon in 2011 to assess the lunar atmosphere and the nature of dust lofted above the ... [> read more](#)

**Lunar Reconnaissance Orbiter: NASA Returns To The Moon With First Lunar Launch In A Decade** (June 19, 2009) — NASA's Lunar Reconnaissance Orbiter has successfully launched aboard an Atlas V rocket from Cape Canaveral Air Force Station in Florida. The satellite will relay more information about the lunar ... [> read more](#)

**NASA Prepares For Performing New Science On The Moon** (June 28, 2007) — NASA has selected proposals.

**Just In:**  
[Lunar Reconnaissance Orbiter Blasts Off](#)

**Science Video News**

**Lunar Eclipse**  
A total lunar eclipse was observed during the summer of 2007. A total lunar eclipse occurs when a full moon passes through the earth's shadow during. ... [> full story](#)

[Robotics Create Rover To Move And Drill On The Moon](#)

[Astronomers Discover That The Earth's Magnetotail Charges The Surface Of The Moon](#)

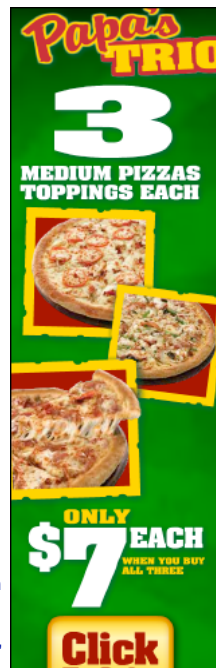
[Planetary Scientists Use Hubble to Spot Oxygen-Rich Soil on Moon](#)

[more science videos](#)



**Breaking News** ... from NewsDaily.com

Canada to ban some chemicals in toys, vinyl bibs  
"Big Bang" collider set for autumn restart: CERN  
Canada to ban some chemicals in toys, vinyl bibs  
Tunnel vision: Swiss can't wait to party  
NASA launches probes to scout the moon  
[more science news](#)



**In Other News ...**  
U.S. judge orders Stanford held for detention hearing  
Iran's Khamenei says end protests, issues warning  
Mubarak says time is right for Arab-Israeli peace  
Clinton has surgery to fix broken elbow  
Nestle recalls Toll House cookie dough after E. coli warning  
CDC sees "something different" with new flu

animated hallway discussions on telemetry, trajectories and camera resolution there is only the soft hum of the lights and AC.

Zack Bowles and Sean Merritt, research analysts on LROC's Science Operations Team, are two of the few members left at the SOC. He and Merritt will be responsible for monitoring the power and temperature status of LROC. The duo has spent many hours preparing for the launch, arriving at the SOC as early as 2 a.m. to run through simulated instrument turn-on procedures.

"We are now very confident in our reaction to different situations involved with monitoring the spacecraft and LROC specifically," states Bowles who recently graduated from ASU with an M.S. in Geology. "To be this involved with an active mission is not something I expected so soon after finishing my master's."

The general schedule of launch day activities begins roughly 12 hours before launch when the mission operations staff at NASA Goddard begins setup. About 10 hours before launch, Bowles and Merritt will establish communication and start running through the launch day configuration procedures. At 6 hours prior to launch, the orbiter, and specifically, the instruments, begin powering on during the "Aliveness Test".

"During this sequence, we deliver LROC's 'Go! No go' status to the payload manager at Goddard who will relay the official payload readiness to the LRO Mission Operations staff prior to launch," explains Bowles. "After the Aliveness Test is performed, the instruments are powered down in preparation for launch – and then it is liftoff!"

Lillian Rose Ostrach, one of Robinson's graduate students working at LROC, is also staying on site for launch. She and a handful of other team members unable to attend launch intend to camp out in front of the big screen TV in the conference room to watch the live countdown.

Since August, Ostrach has helped with whatever needed to be done at LROC, from transferring hand-written calibration notes into spreadsheets to viewing calibration ratio images for possible issues.

"I never imagined that I would be a member of the LROC team; in fact, I never imagined I'd become a lunar scientist," says Ostrach. "There are not many people who get the opportunity of being one of a handful of people viewing, processing, and analyzing new lunar images."

Ostrach's previous research focused on Mars, a planet she was content to stay on, but Robinson helped alter her trajectory. In addition to great training and preparation for future independent, high-caliber research, he offered her the chance to become one of the next generation's lunar scientists and the opportunity to be part of a team seeing the moon in a brand-new way.

"The students involved with LROC will engage in significant data analysis and other projects important to the mission. By graduation, they will be able to point to work accomplishments that are as real and significant as any in the full-time arena," says Tim Donnelly, a member of the LROC Mission Operation Team.


"What we learn here is so unique, but at the same time so universally applicable to space mission operations, that all of us should be able to find positions in future space exploration endeavors," he adds.


**A Day in the SOC**


The SOC isn't your typical office workplace – unless you're accustomed to working in a fish bowl permeated by Apollo-era enthusiasm. Visitors are offered an unimpeded view of LROC operations in action. Wall-size lunar images from the Apollo missions decorate the walls of the glass-enclosed work area containing four workstations facing a large 9-screen grid mounted on the back wall.


After LRO is on its way to the moon Robinson and the rest of the team return from Kennedy Space Center, the real work begins. During its year in low polar orbit around the moon, LROC will capture thousands of images of the lunar surface. The LROC SOC will become a hub for the collection and processing of NAC and WAC images and the accompanying information and meta data such as location, exposure, time, and camera temperature.


LROC Mission Operations team members will plan which lunar regions to image, target them, deliver commands to Goddard Space Flight Center to be relayed to the instrument, and then manage and process all the incoming data. The SOC team is also tasked with analyzing the telemetry of the instrument. Telemetry tells the story of the health of the

 including two from the Jet Propulsion Laboratory in Pasadena, Calif., for future lunar science activities. In addition, the agency has established two new programs that ... > [read more](#)

 **SMART-1's Bridge To The Future Exploration Of The Moon** (Mar. 11, 2007) — ESA's SMART-1 moon mission has become a bridge to the future of lunar science and ... > [read more](#)

 **NASA Selects Investigations For Lunar Reconnaissance Orbiter** (Jan. 5, 2005) — NASA has selected six proposals to provide instrumentation and associated exploration/science measurement investigations for the Lunar Reconnaissance Orbiter (LRO), the first spacecraft to be built ... > [read more](#)

 **Moon's Polar Craters Could Be The Place To Find Lunar Ice, Scientists Report** (Dec. 18, 2008) — Scientists have discovered where they believe would be the best place to find ice on the ... > [read more](#)

 **New NASA Mission To Reveal Moon's Internal Structure And Evolution** (Dec. 12, 2007) — At a Dec. 10 meeting of the American Geophysical Union, NASA's Associate Administrator for Science Alan Stern announced the selection of a new mission that will peer deep inside the moon to reveal ... > [read more](#)

[What Now in Iraq confident about security after U.S. troops leave towns](#)  
[Bailed-out banks' CEOs used jets for personal use: report](#)  
[more top news](#)

Copyright Reuters 2008. See [Restrictions](#).

**Free Subscriptions** ... from ScienceDaily

Get the latest science news with our free email newsletters, updated daily and weekly. Or view hourly updated newsfeeds in your RSS reader:

- [Email Newsletters](#)
- [RSS Newsfeeds](#)

**Feedback** ... we want to hear from you!

Tell us what you think of the new ScienceDaily -- we welcome both positive and negative comments. Have any problems using the site? Questions?

Your Name:

Your Email:

Comments:

Click button to submit feedback:

LROC instrument suite and through simple measures of power and temperature.

Managing and processing the incoming data will also keep the team busy. LROC and Mini-RF, a synthetic aperture radar also onboard LRO, produce large volumes of data in a short amount of time. On a typical day LRO sends down about 440 Gbits (55 Gbytes) of LROC images.

In addition to the science mission of LROC, as part of a separate project Robinson and his team are working with the NASA Johnson Space Center to scan and archive the original flight films from the Apollo missions. The newly scanned images have great scientific (and historic) value and are being used by lunar scientists today. LROC will rephotograph the surface in areas where the highest resolution Apollo orbital images were taken to look for new craters that formed in the past 40 years.

*Adapted from materials provided by [Arizona State University](#).*

Email or share this story: | [More](#)

Need to cite this story in your essay, paper, or report?  
Use one of the following formats:

- APA Arizona State University (2009, June 17). Professor Prepares For America's Return To The Moon. *ScienceDaily*. Retrieved June 19, 2009, from <http://www.sciencedaily.com/releases/2009/06/090618093244.htm>
- MLA

**Search ScienceDaily**

Number of stories in archives: 44,032

Find with keyword(s):

Enter a keyword or phrase to search ScienceDaily's archives for related news topics, the latest news stories, reference articles, science videos, images, and books.

Ads by Google

[Advertise here](#)

**Nasa Satellite Image**  
Get Satellite Maps, Aerial Photos & More With The Free Maps Toolbar  
[Maps.alot.com](http://Maps.alot.com)

**Space Training**  
Space Systems Engineering Courses  
Space Professional Development  
[www.Tsti.net](http://www.Tsti.net)

**Team Building that Works**  
Strategies for Corporate Teams  
Free E-Book on Belbin Team Roles  
[www.improvingteams.com/FreeGuid](http://www.improvingteams.com/FreeGuid)

[About This Site](#) | [Editorial Staff](#) | [Awards & Reviews](#) | [Contribute News](#) | [Advertise With Us](#) | [Privacy Policy](#) | [Terms of Use](#)

Copyright © 1995-2009 ScienceDaily LLC — All rights reserved — Contact: [editor@sciencedaily.com](mailto:editor@sciencedaily.com)