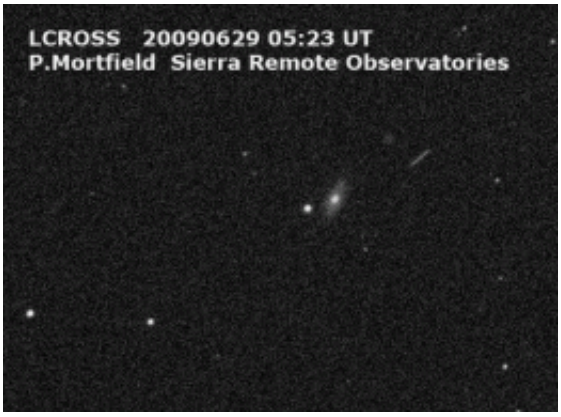
Moonship Photographed by Backyard Astronomers

July 10 2009, by Dr. Tony Phillips



LCROSS photographed on June 29, 2009, by Paul Mortfield using a remotely-operated 16-inch telescope. The spacecraft was about 480,000 km from Earth. (Click for an animated version)

On June 29th, neighbors of Paul Mortfield in Ontario, Canada, heard "cheers of excitement" coming from the astronomer's house. What caused the commotion?

"I had just observed NASA's LCROSS spacecraft," explains Mortfield. Using no more than a backyard telescope, he caught it zipping past spiral galaxy IC3808.

LCROSS is the Lunar Crater Observation and Sensing Satellite. It left Earth June 18th atop an Atlas V rocket on a mission to crash into the

Moon. On Oct. 9th, NASA plans to plunge LCROSS headfirst into a deep crater near the Moon's south pole. Researchers hope the debris it kicks up will reveal water and other minerals of use to future lunar explorers.

Meanwhile, LCROSS is circling the Earth-moon system in a long looping orbit, and NASA is inviting amateur astronomers to help track it.

"The more eyes the better," says Brian Day of NASA's Ames Research Center. "We've got to crash this spacecraft into the bottom of a pitch-black crater a quarter of a million miles away with pinpoint accuracy. Amateur astronomers [can help us] precisely determine the position of LCROSS in flight."

Typically, LCROSS is in contact with the busy Deep Space Network once every three days, which meets all mission requirements. Amateurs can fill in the gaps by observing LCROSS every day.

An artist's concept of LCROSS approaching the Moon.

"During flight, you want to have as many eyes as possible on your spacecraft," notes Day, "not only for tracking, but also in case there is an anomaly. In the past, amateurs have been able to capture venting of materials from shuttles and other spacecraft."

Paul Mortfield had little trouble pinpointing LCROSS: "I was quite surprised at how easy it was to find and follow using my 16-inch telescope. I didn't know what brightness to expect or even if it would be where the ephemeris predicted—but there it was. I saw it in my first 60 second exposure."

"There were definitely cheers of excitement around the house when I saw it on the computer screen."

Mortfield estimates the brightness of the spacecraft to be 16th magnitude, similar to that of many near-Earth asteroids. To find it, he recommends pointing your web browser at JPL's online Horizons ephemeris system (link) and entering 'LCROSS' as the target body. The program will generate a set of coordinates you can plug into the tracking system of almost any modern backyard telescope.

Since Mortfield first caught sight of LCROSS on June 29th, others have seen it too. Portuguese amateur Paulo Lobao photographed LCROSS using a refracting telescope only 4-inches in diameter: details.

"Today's technology is truly amazing, allowing amateurs to capture images far beyond what professionals were doing just a couple of decades ago," says Mortfield.

Indeed, says Day, LCROSS is a fairly easy target for experienced amateurs, and he'd love nothing better than to recruit hundreds of observers to keep track of LCROSS in the months ahead. How does an astronomer get started? "Go to the LCROSS observer's group (link).

Start reading the articles and chatting with other observers," he suggests.

The really big event comes in October when LCROSS crashes into the Moon. Amateur astronomers will be able to observe that, too. Stay tuned for impact observing tips, coming soon from Science@NASA.

Source: Science@NASA, by Dr. Tony Phillips