News

ASU has vital role in new moon voyage

Scientists to send orbiter cameras across moonscape

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The grainy, black-and-white images from the Apollo missions of decades ago are fixed in the memories of anyone old enough to remember them.

But if all goes as planned over the next year, NASA's images of the moon will go high-resolution and wide-ranging as the Lunar Reconnaissance Orbiter snaps pictures to identify safe landing sites for future missions. The unmanned orbiter's launch is set for Wednesday at Cape Canaveral in Florida.

Arizona State University is playing a vital role in the mission. A science team headed by ASU Professor Mark Robinson is in charge of three cameras attached to the minivan-size orbiter.

A separate instrument, the $79 million Lunar Crater Observation and Sensing Satellite, is riding piggyback on the orbiter and is scheduled to slam into the moon about four months later, providing more insight into the moon's makeup.

Two of the cameras are high-resolution black-and-white and capable of zeroing in on objects only a foot or two in size.

A third color camera provides football-field-size, lower-resolution images and is designed to identify hazards such as rocks and craters that could interfere with future landings.

The cameras themselves are a huge challenge. They have to be lightweight yet sturdy enough to survive extreme temperatures and the vibrations of being launched into space.

"Imagine taking your very expensive, brand-new, beautiful Nikon," Robinson said. "And then go down to your local hardware store and strap it on the paint shaker for eight minutes and expect it to work."

The weight challenge is solved by using lightweight carbon fiber, rather than aluminum, for camera telescopes. Thermal blankets and radiators protect the cameras from harsh temperatures.

Making sure the cameras work is just one step. The journey to the moon takes four days, and once there, the spacecraft will spend at least a year circling the moon about 30 miles above surface and taking pictures.

The behind-the-scenes work includes planning where to take photos, writing commands to direct the cameras and decompressing and processing the images. This work will occur in a science building on ASU's Tempe campus. A visitor's center allows people to see the action up close.

Set behind curved glass, science-team members work at four computer stations in the living-room-size operations center. Screens display moon landscapes with areas of potential camera targets highlighted in green. Photos of moon landings decorate one wall. A mannequin nicknamed Judy wears a replica of the white Apollo spacesuit. Nine square video screens display images of the moon's cratered surface. These same 30-inch screens will showcase the first photos from the lunar orbiter, which are expected by July 2.

With just days to go, the science team is ready.

In all, about 25 people at ASU work on the lunar cameras, ranging from undergraduates to doctoral-level scientists. Scientists from five other universities and a private space company are also on the main science team, including the University of Arizona. Another dozen scientists from various institutions are participating, including the U.S. Geological Survey in Flagstaff.

"Everyone feels a real sense of responsibility to get this right," said Tim Donnelly, who has a master's degree

in geographic information systems and is part of the mission operations team.

ASU's role in the lunar orbiter mission is again focusing attention on the school's space research. The university has a history of involvement in space missions, ranging from Mars and Mercury to the Hubble Space Telescope and the Galileo Mission to Jupiter. That research has been overshadowed somewhat by the high-profile Phoenix Mars Mission, which landed a spacecraft on Mars last year to look for ice and is led by UA. ASU scientists continue to publish a steady stream of space research, and the university holds the distinction of having the only scientist, Phil Christensen, to have three science instruments operating on or around Mars.

NASA's return to the moon and the possibility of a manned spaceflight by 2020 could open the doors to even more research.

That's welcome news to geologist Kip Hodges, director of ASU's School of Earth and Space Exploration. He is already working with NASA on plans to train astronauts in geology.

"I love Mars, and we do a lot of work there, but we can't forget there's a tremendous amount of science that can still be done on the relatively accessible moon," he said. "We should do both."

Reach the reporter at anne.ryman@arizonarepublic.com or 602-444-8072.