



## In search of water

—by Peter Henderson

Two spacecraft were crashed by NASA into a lunar crater in October, in the hope of finding sufficient quantities of water to use as fuel for space exploration. The \$79 million program, a bargain by space exploration standards, could help change views of the moon, and evidence of ice could also suggest new possibilities for faster, cheaper space exploration.

"Water is essentially energy," scientist Victoria Friedensen said on NASA TV. "It can be used to make fuel." Three studies released in September found evidence of water on the moon, but the skin of water bound with dust was extremely thin. Hidden in the darkest recesses of the moon, though, in a place where the sun has not shined for a billion years, there might be water ice concentrations of two to three percent which could be of economic importance.

To test this assumption, a two-ton LCROSS (Lunar CRater Observation and Sensing Satellite) and its Centaur rocket were crashed into the eternally dark Cabeus crater near the moon's south pole in the early hours of October 8th. The purpose of the headlong plunge into the lunar surface was to push up a plume of

dust (known as the ejecta) into the sunlight so that it can be photographed and studied for evidence of H<sub>2</sub>O by ground-based telescopes. Cabeus was selected for the crash because the crater was previously identified as a site with high concentrations of hydrogen—a key element in water.

The crash into Cabeus by the bigger craft was expected to push up about 350 tons of material. The smaller craft flew through the plume and hit close to the same spot four minutes later. Before it plunged to its doom, its instruments captured spectroscopic data about the elements released by the initial impact. A video transmitted back from the trailing craft did not show, as hoped, a plume-like eruption of debris, but infrared devices showed a flash lasting about 100 milliseconds. "We got our data," said Tony Colaprete, the mission's principal investigator. "The fact that we saw hot glow means that ice or a pool of water or whatever else might have been there was turning into vapor."

