

## Scientists prepare to 'bomb' the Moon in search for water

Scientists hope to make a splash by "bombing" the Moon with two spacecraft today.

The plan is to slam the projectiles into a dark crater at the lunar south pole, kicking up a six-mile high dust cloud that may contain water. British researchers helped Nasa pick the spot for the drama, which will be broadcast live on the American space agency's website. The Cabeus south polar region was identified by the University of Durham team as a site with high concentrations of hydrogen - a key component of water. It is believed water ice could lie at the bottom of dark craters at the Moon's poles, where temperatures are lower than minus 170C. The crashing spacecraft consist of an orbiter, LCROSS (Lunar Crater Observation and Sensing Satellite), which is now mapping the lunar surface, and its 2.2 tonne empty Centaur launch rocket. As reported in The Times last week, both have been on a collision course with the Moon. In the early hours of today the probe and rocket separated. Then at 12.31pm the larger rocket will smash into the crater at 5,600 mph, blasting out 350 tonnes of debris in a 6.2 mile high plume. Following close behind, the LCROSS satellite beaming live pictures back to Earth will fly through the material and four minutes later plunge into the crater itself. LCROSS will trigger its own dust cloud a third of the size of the first one. As the debris is propelled into sunlight, scientists on Earth will study its composition with ground-based telescopes.

Amateur astronomers in dark parts of the world will be able to view the spectacle through their own instruments. But daylight will make this impossible in the UK. Dr Vincent Eke, from the Institute for Computational Cosmology at the University of Durham, said: "Water ice could be stable for billions of years on the Moon provided that it is cold enough. "If ice is present in the permanently shaded lunar craters of the Moon then it could potentially provide a water source for the eventual establishment of a manned base on the Moon. Such a base could be used as a platform for exploration into the further reaches of our Solar System." The energy generated by the rocket hitting the Moon will be equivalent to exploding about two tonnes of TNT, he said.

He added: "While this sounds dramatic, the impact of this will simply create one more dimple on the moonscape. The cratered surface of the Moon shows it has a history of violent collisions with asteroids and comets." Dr Eke led a study of data from Nasa's 1998 Lunar Prospector mission, which showed that hydrogen was concentrated in permanently shaded craters at the Moon's polar regions. If the hydrogen really is a sign of ice, it implies that the craters could hold a total of 200,000 million litres of water. Last month new findings from three spacecraft, including India's Chandrayaan-1 probe, showed that small amounts of water might be chemically bound up with the Moon's soil.