

Successful first test of high speed 'penetrator'

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High speed 'penetrators' that could one day be used to breach the surface of planets have successfully passed their first test in the UK, accelerating to 700 miles per hour before striking their target. A team led by University College London (UCL) test-fired the projectiles in Wales, recording a peak of 20,000 gee upon impact (where humans can survive up to 10 gee).

Penetrators, which can carry data-collecting systems and sensors, are being developed as an alternative to manned space flight for the future exploration of moons in our solar system.

The team, led by Professor Alan Smith from UCL's Mullard Space Science Laboratory, the University of Surrey, Birkbeck College, Imperial College, the Open University and QinetiQ ran the first three test firings of the high speed penetrators at QinetiQ's long test track in Pendine, South Wales in May 2008. The projectiles were secured to a rocket sledge and fired along a rail track.

The penetrators, which contained a data- and sample-collecting system, a variety of sensors, accelerometers, a seismometer and a mass spectrometer (for analysis) hit a sand target at around 700 miles per hour. The electronics remained fully operational during impact, recording the deceleration in minute detail which peaked at about 20,000 gee (20,000 times the acceleration due to gravity, where humans can only survive around 10 gee).

Penetrator technology is being developed for future space exploration, to pierce the surface of planetary bodies such as our moon and the icy moons of Jupiter and Saturn. Penetrators offer a low cost approach to planetary exploration, but the enormous impact forces have meant that scientists have so far been reluctant to trust them.

Professor Smith said: "Prior to this trial, we had to rely on computer modelling and analysis. As far as we can tell the trial has been enormously successful, with all aspects of the electronics working correctly during and after the impact. I congratulate the team on this really impressive achievement – to get everything right first time is wonderful, and a tribute to British technology and innovation."

The impact trial is part of a series of technical developments and studies in preparation for future planetary space missions. These include the proposed UK MoonLITE mission to the Moon which is hoped to be launched in 2013, and possible missions to moons of the outer planets – Europa, Ganymede, Enceladus and Titan. The trials were funded by the Science and Technology Facilities Council as part of MSSL's Rolling Grant.

Source: University of Surrey

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