

Deep Impact Mission On Target

January 7 2005



The spacecraft for NASA's [Deep Impact](#) mission are now perched atop the Delta II rocket that will launch them on their 6-month journey to encounter a speeding comet. Preparations for the launch, scheduled for January 12, are nearly complete.

Led by University of Maryland astronomer Michael A'Hern, the Deep Impact project will be the first mission to smash a hole in a comet and reveal the secrets of its interior. Comets are balls of ice, gas and dust that orbit the sun. Scientists believe that the permanently frozen cores of comets contain primitive debris from the solar system's formation some 4.5 billion years ago.

"The information we gain from Deep Impact should significantly improve our understanding of how our solar system formed, says

A'Hearn. It also will increase our knowledge of the density and composition of comets, information that could be vital should a comet ever threaten Earth."

Encounter

Deep Impact consists of two spacecraft, a flyby spacecraft that is about the size of a sub-compact car and a coffee-table-sized "impactor." At the beginning of July, after a voyage of some 268 million miles, the joined spacecraft will reach their target, Comet Tempel 1. The spacecraft will approach the comet and collect images of it. Then, 24 hours before the July 4th impact, the flyby spacecraft will launch the copper impactor into the path of the onrushing comet.

Like a copper penny pitched into the grill of a speeding tractor-trailer truck, the 820-pound impactor will hit the comet at a collision speed of some 23,000 miles per hour. With a kinetic energy equivalent to almost 5 tons of TNT, the projectile will smash a crater into the comet. A'Hearn and his fellow scientists expect the crater to range in size from that of a house to a football stadium, and from two to fourteen stories deep. They expect to see ice and dust ejected from the crater revealing pristine material beneath. The impact will not affect the orbit of Tempel 1, which poses no threat to earth.

Deep Impact's flyby spacecraft will collect pictures and data of the event and send them back to Earth. There will also be many other "eyes" watching the impact. NASA's Chandra, Hubble and Spitzer space telescopes will be observing from near-Earth space. Professional and amateur astronomers on Earth also will observe the material flying from the comet's newly formed crater.

The data from all these sources will be analyzed and combined with that from other missions to provide a better understanding of both the solar

system's formation and of the risk of comets some day again colliding with Earth as has happened in the distant past.

Recent Comet Missions

The Deep Impact mission is the eighth mission in NASA's Discovery Program and the third targeted at a comet. The Stardust mission, launched in February 1999, flew through the coma, or cloud, surrounding the nucleus of Comet Wild 2 in January 2004. It collected samples of cometary and interstellar dust, which will be returned to Earth for study in January, 2006. The Comet Nucleus Tour, or CONTOUR, mission launched in July 2002. Unfortunately, six weeks later, on Aug. 15, contact with the spacecraft was lost.

A European Space Agency mission, Rosetta, was launched in March of 2004 on a trip to orbit comet 67P/Churyumov-Gerasimenko. In 2014, it is scheduled to deliver a scientific instrument package to the comet's surface via a lander.

To date, even basic properties such as mass and density have never been measured for any cometary nucleus. Deep Impact will provide the first data probing below the surface of a cometary nucleus and should allow determination of the density of the surface layers. However, determining the mass and overall density of a comet will have to wait until Rosetta mission arrives at its destination.

Source: University of Maryland

Citation: Deep Impact Mission On Target (2005, January 7) retrieved 10 April 2024 from <https://phys.org/news/2005-01-deep-impact-mission.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.