



NASA'S HISTORIC DEEP IMPACT MISSION REVEALS SECRETS OF COMETS

The journey of the Deep Impact space probe ended with a historic bang on the Fourth of July when it collided with a comet.

Nearly 1 billion viewers logged on to NASA's Deep Impact Web site to witness the space probe crash into the Tempel 1 comet at 23,000 miles per hour, sending a cloud of trapped gas and debris into the atmosphere.

Led by a team of scientists from the University of Maryland, the mission was the first to capture close-up images of a comet and its composition.

The pictures contain clues to the formation and evolution of the sun and planets 4.5 billion years ago.

Mission specifics

Launched on Jan. 12 from Cape Canaveral, Fla., the spacecraft made a six-month, 268 million mile journey to Tempel 1.

The Deep Impact spacecraft had two parts -- a flyby craft equipped with high resolution imaging instruments and an 820-pound copper "impactor" to strike and leave a crater on the comet.

Twenty-four hours before the July 4 collision, the impactor was released into the comet's path. It captured and transmitted real-time images of the comet from as close as 18 miles, three seconds before impact.

On impact, Tempel 1 gave off light six times brighter than expected before expelling an unexpectedly large cloud of gas and ice, which blocked scientists' view into the comet's crater. Scientists estimate the crater is larger than a house and possibly the size of a football field.

Mission members must wait for the cosmic dust to settle, allowing a clear view into the comet's interior.

The flyby craft was able to transmit real-time photos of the crash. The Hubble Space Telescope also captured a series of dramatic photos.

Though not visible to the naked eye, sky gazers in the western United States and Latin America were able to witness the impact with a telescope. More than 10,000 people gathered at Hawaii's Waikiki Beach to watch the impact on a giant movie screen.

Mission hailed as a success

Mission members at NASA's Jet Propulsion Laboratory in California exchanged hugs and applauded the mission's success.

"We can say that it went better than we planned. It is absolutely phenomenal how well it went. We didn't have to exercise any of our contingency options and the science we're getting back is phenomenal," mission project manager Rick Grammier told the NewsHour.

Initial analysis of collision images by mission scientists indicates that the comet, shaped like a pocked, lumpy potato, has a soft, powdery surface beneath which lies ice and trapped gas.

Other researchers argue, however, that the spike in ultraviolet light points to a solid surface.

In the coming months scientists will continue to gather and analyze mission data for clues about the comet's surface and interior ingredients.

Comets and our solar system

Comet Tempel 1 was discovered by Ernst Tempel in 1867 and orbits the sun every 5.5 years. The comet's size is about 8.7 miles by 2.5 miles or half the size of Manhattan.

Composed of ice, dust and gas, comets are thought to be the leftover ingredients of our solar system.

"Comets are the leftover bits and pieces from the outer solar system formation process. So if we wish to understand the initial conditions from which the outer solar system formed, the chemical mix and the structure of the particles that came together to form Jupiter, Saturn, Uranus and Neptune, then we'd like to study comets because they haven't changed a great deal in the intervening four and a half billion years," mission scientist Donald Yeomans told the NewsHour.

"We're all made of cometary stuff. The carbon-based molecules in the water that make up our persons are all brought to the early Earth via comets."

Deep Impact's success paves the way for other missions.

The European Space Agency is planning the Rosetta Mission – which will land on a comet and scratch its surface -- for the year 2014.

--Compiled by Monica Villavicencio for NewsHour Extra

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