

Planetary Wonderings

Topic: Stardust

by Mary-Frances Bartels, NASA Solar System Ambassador

Rather than focus on a mission anniversary this month, I decided to discuss one of my favorite modern missions, Stardust. This is the first U.S. space mission dedicated solely to the exploration of a comet, and the first to return extraterrestrial material from outside the orbit of the Moon. The spacecraft was launched on February 7, 1999, from Cape Canaveral, Florida, aboard a Delta II rocket. The primary goal of Stardust is to collect dust samples from Comet Wild 2 - pronounced "Vilt 2" after the name of its Swiss discoverer - a rendezvous that occurred in January 2, 2004. Additionally, Stardust will bring back samples of interstellar dust, including recently discovered dust streaming into our Solar System from the direction of Sagittarius. These particles are believed to consist of ancient pre-solar interstellar grains that include remnants from the formation of the Solar System. Scientists believe the samples will help provide answers to fundamental questions about comets and the origin of the solar system. Using a substance called aerogel, Stardust captured these samples and is storing them for safe keeping on its long journey back to Earth. This silica-based material was inserted into the Aerogel Collector Grid, which looks a bit like a large tennis racket. Aerogel is listed in the *Guinness Book of World Records* as the least dense solid. Ask to see an actual piece of aerogel manufactured for Stardust at one of the January Activity Days. On April 18, 2002, Stardust, reached its farthest distance from the Sun at 2.72 AU (253 million miles or 407 million kilometers). This is the farthest distance ever reached by a solar-powered spacecraft.

The Stardust team is making plans for the craft's Earth return. In the early morning hours of January 15, the sample return capsule, separated from the Stardust spacecraft, will enter the Earth's atmosphere at 28,860 MPH, the fastest of any human-made object on record. It will parachute down to the Utah desert to be retrieved by the recovery team. The landing is scheduled for 5:12 AM EST.

The Stardust web site has many activities to help students learn about comets, the spacecraft itself, space navigation, data transmission, and aerogel. An activity pertaining directly to the spacecraft's return is under the heading of "Spacecraft Design and Testing" at <http://stardust.jpl.nasa.gov/classroom/guides.html>. The first activity familiarizes students with Stardust's systems. In the second activity students make a return capsule.

I am excited to announce the Stardust@Home project. This program involves volunteers that help examine Stardust's aerogel looking for any embedded particles. Participants will remotely control a microscope with the specimen in question. Anyone that finds a particle will appear as a co-author on any scientific paper by the Stardust@Home collaboration announcing the discovery of that particle. More information on this project may be found at <http://stardustathome.ssl.berkeley.edu/>

Questions or feedback on this column are appreciated and may be sent to ki0dz@keeplookingup.net.

Remember: Keep Looking Up!!

Main Source: <http://stardust.jpl.nasa.gov>