

Solar riches survive probe crash

Good news!

BBC

March 23, 2006

The Genesis capsule crash-landed in Utah and, since, scientists have been able to extract precious information from the smashed remains of the Genesis space capsule.

The capsule, carrying captured particles blown off the Sun, crashed into the Utah desert in 2004, after its parachute failed. Less than half the samples are useable, but researchers have been working hard to recover what they can.



They have been presenting their first results at a major science meeting in Houston, Texas.

"We've managed to actually pull something out of this. We've done it," said the mission's chief scientist Don Burnett, from the California Institute of Technology (Caltech).

Reflecting on the terrible day on 8 September 2004 when the 205kg container slammed into the desert floor at 310km/h, Professor Burnett told the BBC News website: "We were too busy to be traumatised – we had work to do. This was a contingency we had planned for. "I won't quote what I said [when it crashed]. But there was about 10 seconds and then we said 'let's go out and see what we can recover'. And we've been recovering it."

The US space agency's \$264m (£151m) Genesis mission spent more than two years gathering ions, or charged atoms, flung out from the Sun. This material is known as the solar wind. I think we will be able to do everything we wanted to do, but it will take us longer

The precise nature of the atoms in the solar wind will tell scientists how our star and the nine major planets grew out of the huge cloud of gas and dust known as the solar nebula more than 4.5 billion years ago.

While the composition of its core has been modified by nuclear reactions, the Sun's outer layers are thought to be from the same material as the solar nebula.

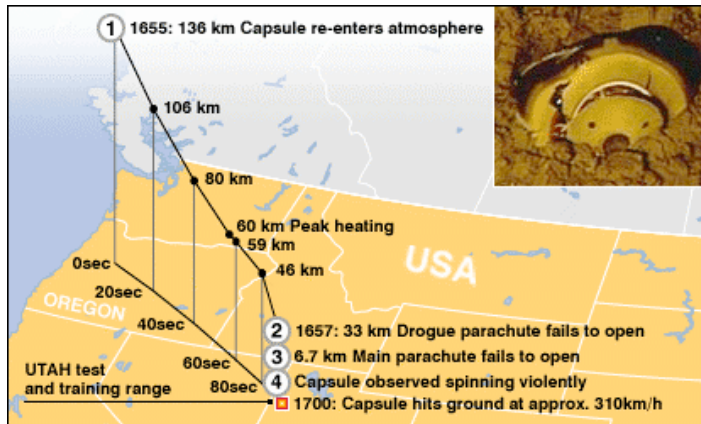
"Anything from the Sun we can apply to the solar nebula. What is in the solar wind has not been changed," explained Dr Burnett.

One of the biggest priorities for the mission is to measure the different forms, or isotopes, of oxygen in the solar wind. Study of different planetary materials over the past few decades has revealed a wide variation in their oxygen isotope composition.

"The reasons for that are somewhat unclear, but what we don't have is the composition for the Sun," the Caltech professor explained. "If we use the oxygen isotopic differences between the different kinds of meteorites, the Earth and the Sun, we can understand

how they formed. For example, it might tell you the planets formed entirely from dust in part of the solar nebula that had nothing to do with the gas. The solar nebula was a ratio between dust and gas. You might be able to form the planets out of the dust and never have any interaction with the gas."

The biggest problem facing scientists hoping to study the surviving Genesis samples is contamination. When the capsule was wrenched apart on impact with the desert floor, material from our planet got mixed in with the solar wind samples.



However, mission scientists have found that the solar wind material is embedded deeper in the sample collection plate than terrestrial contaminants, offering hope that the contamination signal can be minimised.

"I think we will be able to do everything we wanted to do, but it will take us longer. Ask me in a year and a half, I'll be

in a better position to say," said Dr Burnett.

An inquiry into the Genesis crash found that switches in the capsule had been installed upside down, which may have led to failure of its parachute.

Launched in 2001, Genesis captured its samples of charged atoms from the solar wind on five collecting plates hung outside the spacecraft for more than 800 days in a region of space about 1.5 million km from Earth.

Scientists working on the mission presented early results from their studies here at the Lunar and Planetary Science Conference in Texas.