

THE GENESIS MISSION: CONTAMINATION CONTROL AND CURATION

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The Genesis mission, launched in August 2001, is collecting samples of the solar wind and will return to Earth in 2004. Genesis can be viewed as the most fundamental of NASA's sample return missions because it is expected to provide insight into the initial elemental and isotopic composition of the solar nebula from which all other planetary objects formed. The data from this mission will have a large impact on understanding the origins and diversity of planetary materials.

The collectors consist of clean, pure materials into which the solar wind will imbed. Science and engineering issues such as bulk purity, cleanliness, retention of solar wind, and ability to withstand launch and entry drove material choices. Most of the collector materials are installed on array frames that are deployed from a clean science canister. Two of the arrays are continuously exposed for collecting the bulk solar wind; the other three are only exposed during specific solar wind regimes as measured by ion and electron monitors. Other materials are housed as targets at the focal point of an electrostatic mirror, or "concentrator", designed to enhance the flux of specific solar wind species.

Johnson Space Center (JSC) has two principal responsibilities for the Genesis mission: contamination control and curation. Precise and accurate measurements of the composition of the solar atoms require that the collector materials be extremely clean and well characterized before launch and during the mission. Early involvement of JSC curation personnel in concept development resulted in a mission designed to minimize contaminants from the spacecraft and operations.

A major goal of the Genesis mission is to provide a reservoir of materials for the 21st century. When the collector materials are returned to Earth, they must be handled in a clean manner and their condition well documented. Information gained in preliminary examination of the arrays and detailed surveys of each collector will be used to guide sample allocations to the scientific community. Samples allocated for analysis are likely to be small sections of individual collectors, therefore subdividing the materials must take place in a clean, well characterized way. A major focus of current research at JSC includes identifying and characterizing the contamination, waste, and alteration of the sample when using different subdividing, transport, and storage techniques and developing protocols for reducing their impact on the scientific integrity of the mission.