The NASA Discovery STARDUST Mission

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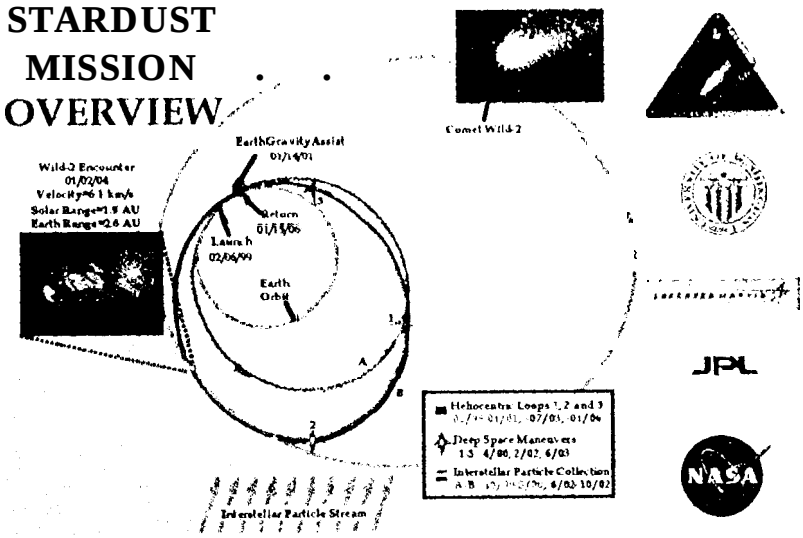
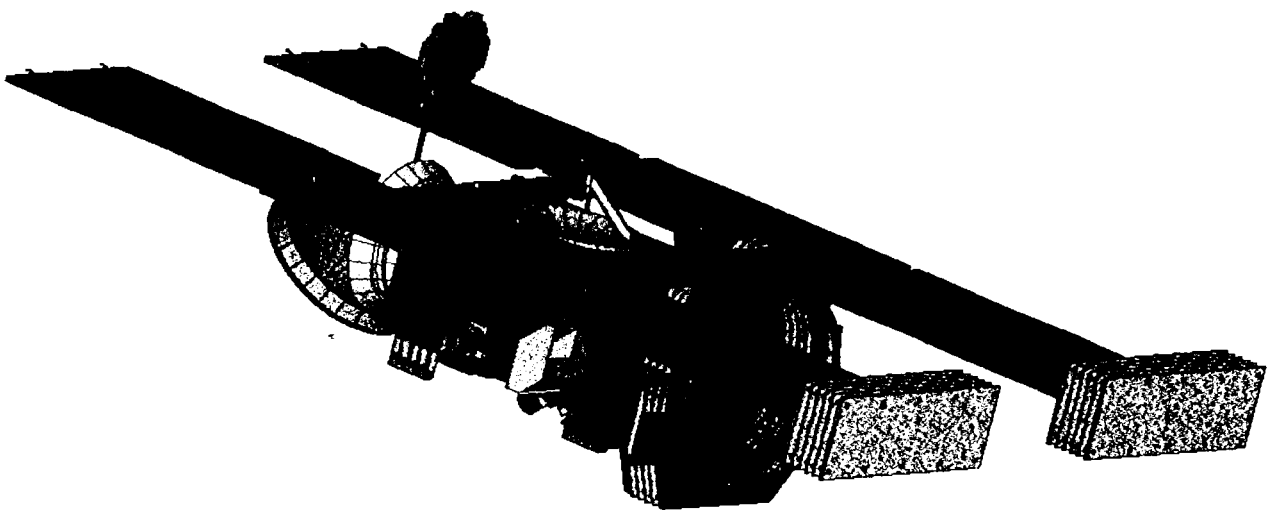
The STARDUST Discovery mission will collect samples of cometary coma and interstellar dust and return them to Earth. Five years after launch in February 1999, coma dust will be captured by impact into ultra-low–density silica aerogel during a 6 km/s flyby of Comet Wild 2. The returned samples will be investigated at laboratories where the most critical information on these primitive materials is retained. The Jet Propulsion Laboratory provides project management with Lockheed Martin Astronautics as the spacecraft industrial partner. STARDUST management is aggressively pursuing cost control through the use of Total Quality Management principles, specifically operating in a Project Engineering and Integration Team that "flattens" the traditional hierarchical structure by including all project elements from the beginning, in a concurrent engineering framework focusing on evolving integrated Mission Capability

STARDUST, the fourth in a series from the NASA Discovery Program, is a comet (Wild-2) coma sample return mission. Launched in February 1999 on a Delta 11 (7426), the spacecraft will carry an aerogel dust collector capable of achieving non-destructive capture of dust particles impacting at hypervelocities. The flyby of the comet takes place in January 2004 at a planned flyby distance of 150 km and a relative flyby velocity of 6.1 km/s. The collected samples will be returned to Earth via direct Earth entry and will land in Utah in January 2006. Additional science returns: high resolution comet images, collection of interstellar particles and in-situ compositional analysis of particles arc also planned. This paper presents detailed trajectory design and mission plans as well as an overview of the science plans, systems design and the navigational approaches.

This paper represents the results of work carried out at the Jet Propulsion Laboratory, California Institute of Technology under contract to the National Aeronautics and Space Administration to support the Discovery STARDUST Project.



STARDUST MISSION DESIGN



STARDUST SPACECRAFT