

Abstract for IAA International Conference  
on Low Cost Planetary Missions

A Smaller, Faster, Cheaper Interstellar Probe  
by

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The Interstellar Probe Mission is designed to cross the solar wind termination shock and heliopause and make a significant penetration into the interstellar medium. The spacecraft should be targeted toward the nose of the heliosphere reaching a heliocentric distance of 200 AU within 25 years from launch. The payload should make selected measurements of plasma, fields, energetic particles, gas and dust.

While advanced propulsion is an attractive technology option much can be achieved with current propulsion capabilities provided the spacecraft is sufficiently small. Launch vehicles as small as a Delta or an Atlas/Centaur are shown to be adequate. Small launch vehicles enable low life cycle costs.

Trajectory design may require close flybys of Jupiter and/or the Sun and large post-launch maneuvers. Performance data is provided for a range of trajectory types and spacecraft masses. Innovative trajectory design enables shorter flight times, reducing life cycle costs.

A preliminary design for a spacecraft, including candidate science instruments, in the same mass regime as those for the Pluto Fast Flyby<sup>1</sup> and Solar Probe<sup>2</sup> will be presented. Recent work verifies that new technologies allow the spacecraft and payload to be reduced in mass by a factor of five, compared to 1990 study results. Measurement capabilities are beyond those of the Voyager Interstellar Mission. The technology requirements for such a mission will be derived and summarized. Opportunities will be presented wherein the utilization of the technologies from earlier missions (such as Small Solar Probe) will be shown to enable a low cost mission that exits the Solar System.

<sup>1</sup>Stahle, Robert L., et al., "Exploration of Pluto: Search for Applicable Spacecraft Technology", Sixth Annual AIAA/Utah State University Conference on Small Satellites, September 21-24, 1992.

<sup>2</sup>Evans, W. Michael, "Small Solar Probe Spacecraft Design Studies", Seventh Annual AIAA/Utah State University Conference on Small Satellites, September 16-19, 1993.