

Abstract

The Interstellar Program – Developing Gossamer Technologies for the Next 50 years

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In February, 1999, the National Air and Space Administration (NASA) and the Jet Propulsion Laboratory (JPL) established an Interstellar and Solar Sail Technology Program, whose goal is to launch exploratory spacecraft to the near interstellar medium in the next 10 years, and to the nearest star within the next 40 years. Later that year, NASA's Sun-Earth-Connection (SEC) subcommittee established a new quest and a campaign entitled "Explore the Boundaries of the Heliosphere and Near Interstellar Environment" to its roadmap theme, with the Interstellar Probe proposed to launch as a flagship mission in 2010. Shortly after, an Interstellar Pre-Project Office was established at JPL with the expectation that recent technological advances are close to enabling missions which use photons to accelerate Gossamer-like spacecraft using very large, light-weight sails (400 m to 1 km in diameter). Interstellar travel provides a challenging vision for these technologies, as velocities of up to 20 AU/Year are required for near interstellar medium travel, and up to half the speed of light are desired to reach the nearest stars. Some interstellar mission concepts also use these large sails as communication antennas, or as instruments for science data collection. This paper will give an overview of the proposed Interstellar Program, with emphasis on Gossamer concepts and technologies.