

Inside NanoSail-D: A Tiny Satellite with Big Ideas

“Small But Mighty” certainly describes the NanoSail-D experiment and mission. Its unique goals and designs were simple, but the implications of this technology are far reaching. From a tiny 3U CubeSat, NanoSail-D deployed a 10 square meter solar sail. This was the first sail vehicle to orbit the earth and was only the second time a sail was unfurled in space.

The NanoSail-D team included: two NASA centers, Marshall and Ames, the universities of Alabama in Huntsville and Santa Clara in California, the Air Force Research Laboratory and many contractors including NeXolve, Gray Research and several others. The collaborative nature was imperative to the success of this project. In addition, the Army Space and Missile Defense Command, the Von Braun Center for Science and Innovation and Dynetics Inc. jointly sponsored the NanoSail-D project.

This paper presents in-depth insight into the NanoSail-D development. Its design was a combination of left over space hardware coupled with cutting edge technology. Since this NanoSail-D mission was different from the first, several modifications were necessary for the second NanoSail-D unit. Unforeseen problems arose during refurbishment of the second unit and the team had to overcome these obstacles. Simple interfaces, clear responsibilities and division of effort allowed the team members to work independently on the common goal. This endeavor formed working relationships lasting well beyond the end of this mission. NanoSail-D pushed the technology envelop with future applications for all classes of satellites.

NanoSail-D is truly a small but mighty satellite, which may cast a very big shadow for years to come.