



Pathfinder Technology Demonstrator

Demonstrating Novel CubeSat Technologies in Low Earth Orbit

NASA's Pathfinder Technology Demonstrator (PTD) project will test the operation of a variety of novel CubeSat technologies in low-Earth orbit, providing significant enhancements to the performance of these small and effective spacecraft. Each Pathfinder Technology Demonstrator mission consists of a 6-unit (6U) CubeSat weighing approximately 26 pounds (12 kilograms) and measuring 12 inches x 10 inches x 4 inches (30 centimeters x 25 centimeters x 10 centimeters), comparable in size to a common shoebox. CubeSats are a class of nanosatellites that use a standard size and form factor. The standard CubeSat size uses a "one unit" or "1U" measuring 4 inches x 4 inches x 4 inches (10x10x10 centimeters) and is extendable to larger sizes by "stacking" a number of the 1U blocks to form a larger spacecraft. Each PTD spacecraft will also be equipped with deployable solar arrays that provide an average of 44 watts of power while in orbit.

The PTD project—led by NASA's Ames Research Center at Moffett Field, California, in collaboration with NASA's Glenn Research Center in Cleveland, Ohio—will benefit future missions by demonstrating the operation of new subsystem technologies on orbit. These include propulsion systems that provide the capability to maneuver small science platforms and send small spacecraft to deep space; novel technologies to stabilize spacecraft and laser communications systems that will greatly increase the amount of data that can be transmitted from the spacecraft to the ground. As small spacecraft increase mobility and capability, NASA benefits by flight qualifying these subsystems by having access to low-cost, highly capable, science and tech-



Concept of a PTD 6U with Three Microfluidic Electro-spray Engines

nology platforms that can operate from the near-Earth to the deep space environment.

The PTD mission is funded through NASA's Small Spacecraft Technology Program (SSTP), which is chartered to develop and mature technologies to enhance and expand the capabilities of small spacecraft with a particular focus on communications, propulsion, pointing, power, and autonomous operations. The SSTP is one of nine programs within NASA's Space Technology Mission Directorate.

For more information about the SSTP, visit:
<http://www.nasa.gov/smallsats/>

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