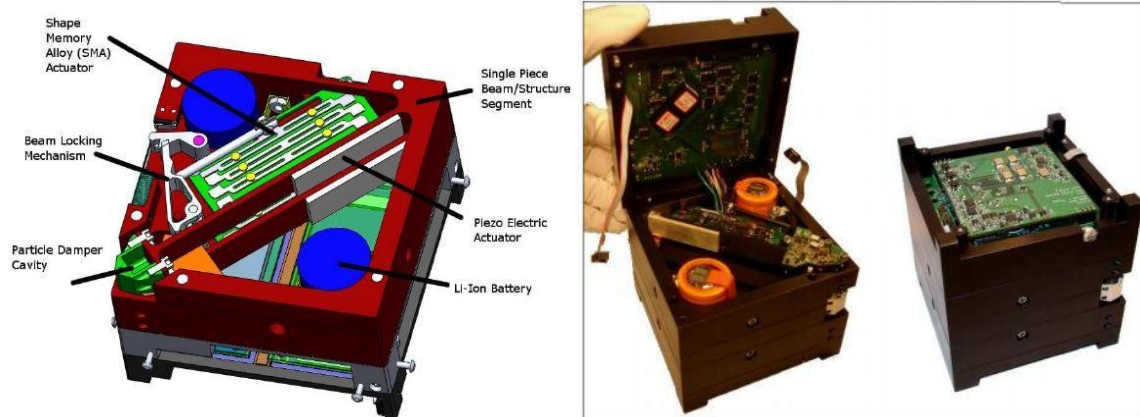


DAVE (CP7) – California Polytechnic State University – 1U



The Damping and Vibration Experiment (DAVE) CubeSat implements a payload to evaluate a mechanical damping technology in microgravity. This technology, called particle damping, exploits the dynamics of multiple constrained particles to dissipate vibration energy. Terrestrial applications demonstrate particle damping performance to be largely unaffected by extreme environments yet simple and cheap to implement. This feature set makes particle damping an attractive technology for applications in spacecraft, where dampers are needed to steady sensitive instrumentation and inhibit destructive structural resonant modes. In orbit, DAVE provides a low cost and low risk platform to characterize unknown particle damper microgravity behavior and provide flight heritage for particle damper technology. The completion of these objectives overcomes barriers currently inhibiting the employment of particle dampers in space.

DAVE is equipped with one OmniVision imager. The primary purpose of the imager is verifying the rotation rates of the spacecraft prior to performing experiments. The secondary mission is acquiring Earth imagery to support public outreach activities.

After deployment from the P-POD, the satellite will power on. Approximately 15 minutes later, antenna deployment will occur. 115 minutes after antenna deployment, the beacon will be activated and the satellite will be available to acquire with the ground station. A full parameter sweep vibration experiment will begin automatically within a few hours of launch. Results will be downloaded over subsequent passes. Additional experiments can be commanded from the ground as necessary to improve confidence in the results.

The structure is made entirely of 6061-T6 Aluminum. The antenna is made of NiTi and Delrin. The ceramic piezo electric beam actuators are lead zirconate titanate. The tips of the booms contain tungsten particles. The satellite contains mostly standard commercial off the shelf materials, electrical components, PCBs, and solar cells.

There are no pressure vessels, hazardous materials, or exotic materials. The cavities containing the tungsten particles are not freely vented.

There are 2x UL listed 3.6V 4000mAh Lithium-Ion 26650 batteries connected in parallel. The UL listing number is MH61586. There is battery protection circuitry and over-charge protection.