

ELaNa V CubeSat Launch on SpaceX-3 Mission

March 2014

OVERVIEW

NASA will launch five small research satellites, or CubeSats, for three universities and the agency's Ames Research Center at Moffett Field, Calif., as part of the fifth installment of the Educational Launch of Nanosatellite (ELaNa) mission. Over 120 students have been involved in the design, development and construction of the CubeSats that will be flown as auxiliary payloads on the SpaceX-3 cargo resupply mission to the International Space Station; launch is planned for March 2014.

The CubeSat Launch Initiative (CSLI) enables the launch of CubeSat projects designed, built and operated by students, teachers and faculty to obtain hands-on flight hardware development experience. CSLI also provides access to space for CubeSats developed by the U.S. government and non-profit organizations giving all these CubeSat developers access to a low-cost pathway to conduct research in the areas of science, exploration, technology development, education or operations. Since its inception in 2010, the initiative has selected more than 100 CubeSats from primarily educational and government institutions across the United States. These miniature satellites were chosen from a prioritized queue established through a shortlisting process from proposers that responded to public announcements on NASA's CubeSat Launch Initiative. NASA will announce another call for proposals in mid-August 2014.

CUBESAT DEPLOYMENT

NASA selected five CubeSat projects to launch on the ELaNa V mission, which is managed by the agency's Launch Services Program. There will be four P-PODs aboard the Falcon 9 rocket that will ferry them to space. The P-POD was designed and manufactured by the California Polytechnic State University of



Basic CubeSat Facts:

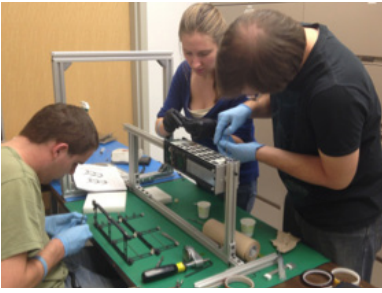
- Built to standard dimensions of 1 unit (1U) which is equal to 10x10x10 cm
- Can be 1U, 2U, 3U or 6U in size
- Weigh less than 1.33 kg (3 lbs) per U – 6U may be up to 12-14 kg
- Deployed from standard Poly-Picosatellite Orbital Deployer (P-POD)

San Luis Obispo, Calif., to integrate CubeSats onto launch vehicles. After the main payload deploys, the CubeSats will separate from their P-PODs. After 45 minutes in orbit, the CubeSat transmitters will turn on and university ground stations will listen for their beacons, determine their small satellites' functionality and announce operational status. CubeSat mission durations and orbital life vary, but are anticipated to last at least 90 days. Upon mission completion, the CubeSats fall to Earth, burning up in the atmosphere.

SAFETY AND MISSION ASSURANCE

Each CubeSat developer verified that its satellite complied with the P-POD requirements and jointly conducted a mission readiness review with NASA.

NASAfacts

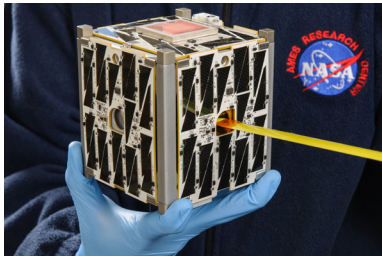


ALL-STAR

*Agile Low-cost Laboratory for Space Technology Acceleration and Research
University of Colorado at Boulder*

The ALL-STAR mission consists of a low-cost 3U CubeSat bus capable of supporting operation of a variety of space-based research payloads. It will be deployed with the THEIA (Telescopic High-definition Earth Imaging Apparatus) optical payload that images Earth in full color in order to verify all capabilities of the ALL-STAR bus, providing a proof of concept.

spacegrant.colorado.edu/allstar



PhoneSat 2.5

Ames Research Center

PhoneSat 2.5 is the fourth in a series of missions designed to use commercially available smartphone technology as part of a low-cost development for basic spacecraft capabilities. The technology demonstration is a pathfinder for the [Edison Demonstration of Smallsat Network](#) and will collect data on the long-term performance of consumer technologies used in spacecraft.

www.phonesat.org

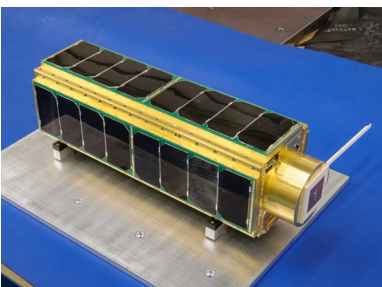


KickSat

Cornell University – Ithaca, N.Y.

KickSat is a technology demonstration mission designed to demonstrate the deployment and operation of 104 Sprite “ChipSats” (3.2 x 3.2 cm femtosatellites with a thickness of a few millimeters) developed at Cornell University. The ChipSats will have an orbital lifetime of only a few days. ChipSats like the Sprites represent a new space technology that could enable new kinds of science and exploration missions, as well as lower the cost of access to space. KickSat was funded by over 300 individual backers on the crowd-funding website Kickstarter.

www.kicksat.net

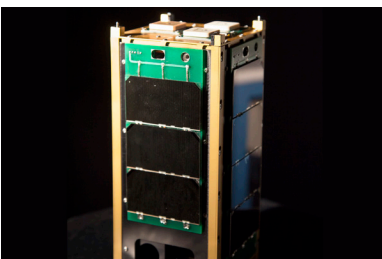


SporeSat

*Determining Gravitation Sensing Threshold in Plants in Space
Ames Research Center*

SporeSat is a space biology science mission designed to gain a deeper knowledge of the mechanism and determine the threshold of cell gravity sensing by studying the activation of calcium ion channels vs. gravity level in a single cell model system (the fern spore *Ceratopteris richardii*) using a “lab-on-a-chip” microsensor technology platform.

www.nasa.gov/centers/ames/engineering/projects/sporesat.html



TSAT - TESTSat-Lite

Taylor University – Upland, Ind.

TESTSat-Lite is a dual mission using the GlobalStar satellite communication modem to demonstrate a reliable and global nanosat network and a Space Weather bus design consisting of a plasma probe, 3-axis magnetometer, and 3 ultraviolet photodiodes. The project is a collaboration with the University of Chile in Santiago.

space.taylor.edu

For additional information about NASA’s CubeSat Launch Initiative program, visit: http://go.nasa.gov/CubeSat_initiative. Follow us on Twitter: @NASAExplores

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NF-2014-03-581-HQ

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