National Aeronautics and Space Administration

ELaNa II CubeSat Launch on NROL-39 Mission

December 2013

NASAfacts

OVERVIEW

NASA will launch four small research satellites, or CubeSats, for three universities and NASA's Jet Propulsion Laboratory (JPL) in Pasadena, Calif., as part of the fifth installment of the Educational Launch of Nanosatellite (ELaNa) mission. Over 100 students have been involved in building the CubeSats that will be flown as auxiliary payloads on the National Reconnaissance Office's launch of its NROL-39 mission planned for December 2013.

The ELaNa CubeSat Launch Initiative enables students, teachers and faculty to obtain hands-on flight hardware development experience and gives them access to a low-cost vehicle to conduct research in the areas of science, exploration, technology development, education or space missions. Since its inception in 2010, the initiative has selected more than 90 CubeSats from primarily educational and government institutions around the U.S. These miniature satellites resulted in 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

Four CubeSat projects were selected for the ELaNa II mission. There will be two Poly Picosatellite Orbital Deployers (P-PODs) aboard the Atlas V rocket that will ferry them to space. The P-POD was designed and manufactured by the California Polytechnic State University (Cal Poly) of 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 180 days. Upon mission completion, the CubeSats fall to Earth, burning up in the atmosphere.

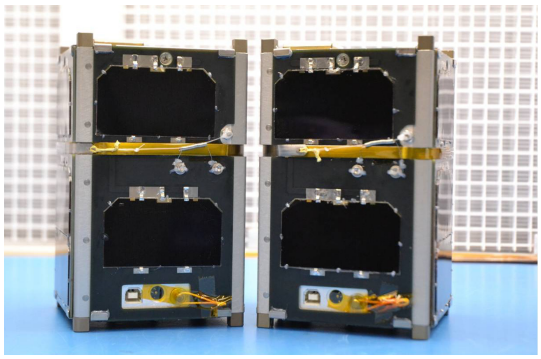
Basic CubeSat Facts:

- 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 11/3 kg (3 lbs) per U – 6U may be up to 12-14 kg
- Deployed from standard Poly-Picosatellite Orbital Deployer (P-POD)

SAFETY AND MISSION ASSURANCE

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

CUNYSAT-1

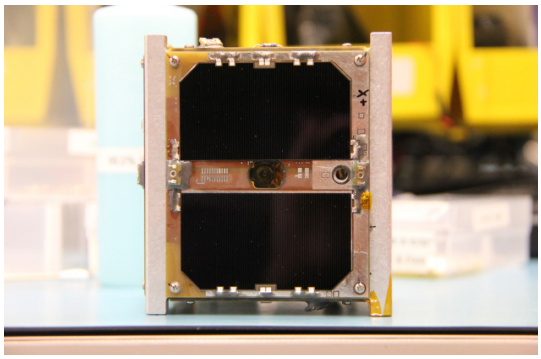


Medgar Evers College – Brooklyn, N.Y.
City University of New York (CUNY)
CUNYSAT-1's mission is to provide faculty and students with hands-on flight development experience. The mission includes investigating ionospheric disturbances. By measuring GPS signal changes, CUNY scientists can determine disturbances of the ionospheric charge densities. CUNY students will be monitoring satellite spin and battery and solar panel efficiencies.
www.mec.cuny.edu/cunysat-1

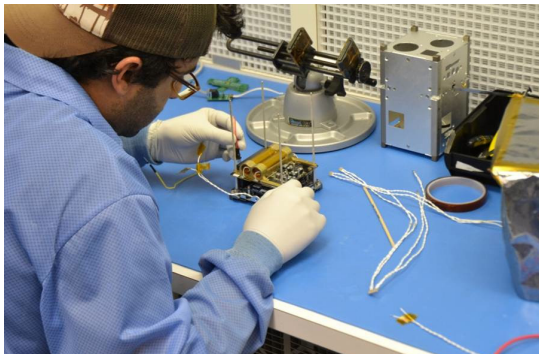
IPEX

Intelligent Payload Experiment
JPL
IPEX is a mission to validate various intelligent payload module (IPM) technologies including autonomous onboard instrument processing, downlink operations, and automated ground operations. IPM capability is currently baselined for JPL's Hyperspectral Infrared Imager Decadal Survey mission that will study the world's ecosystems.
http://polysat.calpoly.edu/in-development/cp8-ipex/

M-Cubed-2



Multipurpose Mini-satellite
University of Michigan – Ann Arbor, Mich.
M-Cubed-2's mission is to obtain mid-resolution color imagery of Earth's surface and to carry the JPL/Caltech-developed CubeSat On-board processing Validation Experiment (COVE). COVE will advance technology required for real-time, high-data-rate instrument processing relevant to future Earth science missions. M-Cubed-2 is a re-flight after the original M-Cubed unintentionally became attached to another CubeSat shortly after launch, losing the ability to transmit in the process.
exploration.engin.umich.edu/



FIREBIRD-1A,1B

Montana State University – Bozeman, Mont.
University of New Hampshire – Durham, N.H.
Focused Investigations of Relativistic Electron Burst, Intensity, Range, and Dynamics's (FIREBIRD) mission is to provide insight into acceleration and loss processes in the outer Van Allen Radiation Belt and to provide hands-on opportunities for undergraduate and graduate students to develop flight hardware.
ssel.montana.edu/firebird/

For additional information about NASA's CubeSat Launch Initiative program, visit: http://go.nasa.gov/CubeSat_initiative.

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