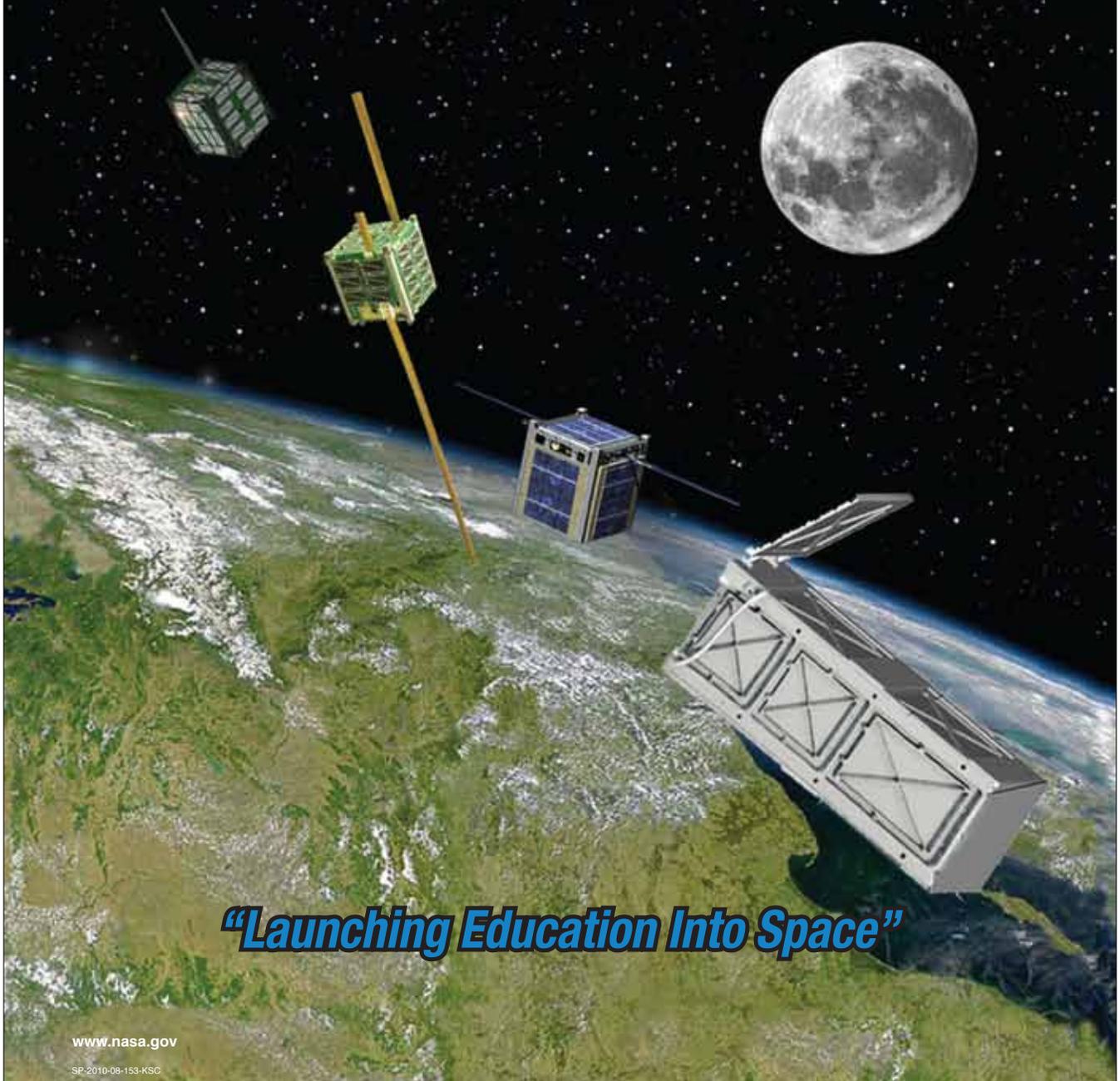




Launch Services Program presents...

ELaNa **NASA·CalPoly**

Educational Launch of Nanosatellite



“Launching Education Into Space”

P-POD

One of NASA's missions is to attract and retain students in the science, technology, engineering and mathematics, or STEM, disciplines. Creating missions or programs to achieve this important goal helps to strengthen NASA and the nation's future work force as well as engage and inspire Americans and the rest of the world.

NASA's Educational Launch of Nanosatellite, or ELaNa, missions are the first educational packages to be carried on an expendable launch vehicle for the agency's Launch Services Program. They are small secondary satellite payloads that will fly aboard NASA missions beginning in 2010.

ELaNa missions carry tiny satellites, called CubeSats, that are designed and created by university and college students. The CubeSats are carried in a Poly Picosatellite Orbital Deployer, or P-POD, container.

The P-POD and CubeSat Project were developed by California Polytechnic State University in San Luis Obispo, CA., in partnership with Stanford University's Space Systems Development Lab. The P-POD flew previously on Department of Defense and commercial launch vehicles.

The P-POD is an aluminum container measuring 5 inches square by about 16 inches long. One P-POD can carry up to three tiny CubeSats as an auxiliary payload aboard one of NASA's expendable launch vehicles.

The CubeSats each measure about 4 inches cubed, with a volume of about 1 quart, and weigh in at less than 2.2 pounds. Each CubeSat must conform to standard aerospace materials requirements, orbital debris requirements and operate without the use of propulsion.

During an expendable launch vehicle mission, the primary payload is launched first. After it has separated from the upper stage, a signal is sent from the launch vehicle to open the P-POD door. After the door is opened, a spring is used to push each CubeSat from the P-POD.

During NASA's Glory mission aboard a Taurus XL in November 2010, the first P-POD will carry three CubeSats.

They are Montana State University's Explorer 1 Prime, or E1P; the University of Colorado's Hermes-1; and the KySat-1 orbital satellite created by several Kentucky universities that combined to form the Kentucky Space Consortium.

E1P will study variations in the Van Allen radiation belts and fly to commemorate the 50th anniversary of Explorer-1, America's first satellite, which discovered the cloud of highly energetic electrons trapped in Earth's magnetic field in 1958. The cube contains a miniature Geiger tube donated by Dr. James Van Allen and will be used to measure the intensity and variability of the electrons in low Earth orbit.

Hermes-1 was the efforts of 70 students who contributed to the design, fabrication and testing of the system. Hermes' primary goal is to design a reproducible satellite bus that can be used for future missions. The science goal is to test the viability of a high-speed communications system in the hopes of replicating the system on future CubeSats.

The KySat-1 orbital satellite's primary mission is educational outreach to university students who designed the satellite, and kindergarten through 12th-grade students and teachers, ultimately providing opportunities for hands-on learning in the STEM disciplines.

The KySat-1 outreach payload includes a low-resolution camera and a relatively high-powered UHF/VHF radio to allow satellite communication from small portable ground stations that can easily be set up on a playground or parking lot of a school. The tiny satellite carries a communications payload -- a commercial 2.4 GHz high-speed transceiver that will be tested for feasibility of use in a space environment.

The Glory spacecraft was developed by NASA's Science Mission Directorate. Glory will extend the nearly 30-year record of precise measurements of the sun's energy output. It also will obtain first-ever, global measurements of the distribution of tiny airborne aerosol particles. Aerosols represent one of the greatest areas of uncertainty in understanding Earth's climate system.

NASA plans to launch additional CubeSats on future expendable launch vehicle missions in 2011 and 2012.



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