

Students' payload to help NASA test high-altitude 'research lab'

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When NASA launches its new Deep Space Test Bed (DSTB) facility later this month, an experiment designed and built by undergraduate students in the College of Engineering will be aboard.

The experiment, which is titled "Characterization of Aerosols in the Troposphere and the Stratosphere (CATS)," will use a digital camera and a spectrometer coupled to a telescope to detect trace chemicals in the atmosphere. The goal is to identify pollution-related aerosols -- solid or liquid particles in the air -- in the troposphere, which rises eight miles above sea level, and the stratosphere, which goes to about 31 miles.

Electrical engineering senior David Chen and CATS team leader explained, "When our experiment is in the troposphere and stratosphere, we'll use the spectrometer to measure the optical scattering of air particles while taking pictures with the digital camera. Later, when we get the results back, we'll be able to compare the pictures with the spectrometer data and see what that tells us."

In addition to their own experiment, the Penn State team worked with students at Greencastle-Antrim Middle School in Greencastle, to design and build "BalloonSat," an imaging payload that will also fly aboard the DSTB facility.

"BalloonSat consists of a film camera and a logging device controlled by a timing circuit," Chen says. "It will take pictures and record the pressure and temperature at regular intervals. It's a fairly simple goal, but

we're hoping the data collected will correlate with those collected by CATS."

Besides Chen, the CATS team includes Michael Barrucco, Kevin Chan, Dillon Collins, Jon Cumblad, Xiaoqiang Liao, Joseph Tam and Joshua Yacobucci. Faculty advisers are Sven Bilen, assistant professor of engineering design and electrical engineering, and Russell Philbrick, professor of electrical engineering.

The Penn State team earned a spot on the DSTB test flight by submitting a winning proposal to NASA's Student Launch Initiative Program, a hands-on education program sponsored by the Marshall Space Flight Center and the National Space Grant Consortium. Student teams from Montana State University, the University of Alabama and Auburn University also will have experiments aboard the flight. The student experiments will help NASA test the DSTB's structural integrity, power system and data management system.

The DSTB is an aluminum gondola about the size of a standard passenger car that will be lifted by a 40-million-cubic-foot scientific balloon to an altitude of about 120,000 feet, or nearly 23 miles. The gondola is intended to fly polar routes to enable scientists to study cosmic rays. Its initial test flight, however, will launch from Fort Sumner, N.M. The flight is expected to last up to 24 hours.

Source: Penn State

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