

UK students 'fly' in Texas space center

Class tests zero gravity

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Courtesy of NASA Visit Texas: Traveling to Johnson Space Center in Texas from Paducah were (back row) Dr. Jack Leifer, adviser; students Alicia Crainshaw, David Pugh, Chris Meyer, Tracy Kulik, Jeni Dowell; (front) Mike McWaters, Jamie Belt, Chris Tempus, Corey Pace.

Paducah engineering student Michael McWaters now knows how it feels to weigh nothing.

"I was surprised how easy it is to push off of something in zero gravity," he said. "I stood and ended up bouncing up to the ceiling and hitting the floor again before I could center myself."

McWaters and the "Weightless Wildcats," a Paducah-based University of Kentucky mechanical engineering class, spent the past two weeks at the Johnson Space Center in Texas examining the effects of zero gravity on a class-designed system measuring the

impact of colliding space objects. The students were able to test the system in a weightless environment through NASA's Reduced Gravity Student Flight Opportunity Program.

A Zero Gravity KC-135 plane, also known as the "Weightless Wonder," took the two-person student flight crews from a simulated starting altitude of around 25,000 feet to 40,000 feet in 30 seconds, then back down to 25,000 feet in 30 seconds. Students experienced "free floating" during the down cycles and felt as if they weighed twice as much when traveling up, pinning them to the floor.

The class experiment measured the impact forces vs. acceleration on a cylindrical satellite model, said Jack Leifer, assistant professor of mechanical engineering. The plane made 30 cycles to allow the students to conduct their experiments.

The students showed that a gravity-based mathematical algorithm measuring force magnitude and location also applies in zero gravity. The algorithm was first proposed at Sandia National Laboratory in Albuquerque, N.M. Leifer said the Johnson Space Center has expressed interest in the students' findings because the experiment is applicable to spacecraft docking issues. The class will publish a technical manual detailing its work within the next year.

"I'm very proud of my students," Leifer said. "Unlike a lot of experiments that were taken up there, ours worked and it worked flawlessly. And that's because of the time and effort they put into it."

"Fliers" were chosen based on seniority and contribution to the experiment. The remaining five students served as ground crew. The flight crews — McWaters and Salem senior Jamie Belt, La Center senior Corey Pace and Smithland senior Christopher Tempus — said any fears of illness were quelled by a powerful mixture of anti-motion sickness medication given only to NASA pilots and astronauts.

"I never felt sick," Belt said. "But it took us about three (trips up and down) before we could start working. Once you get up there, you're not in control. The plan is thrown out the window, and you just do the best you can."

Leifer said the interior of the plane was covered with thick padding. The students also received four hours of training to help them recognize the symptoms of oxygen deprivation and claustrophobia. The trip was described as a broadening experience by Pace, who helped write the project proposal and earned independent study credit for the class.

"This has shown me what's available outside western Kentucky," he said. "There's a big world out there. There are a lot of people who work for NASA, and a lot of them are engineers. I'm not saying that's definitely where I want to go, but it could be a good opportunity for me."

Pace and Leifer will write a proposal, due in October, to send another set of students to Texas next summer. Thirty-three of the 50 college groups that applied to the program were accepted this year, including students from Brown University, Purdue University and the Massachusetts Institute of Technology. The University of Kentucky has sponsored flight opportunity groups over the past five years through the Kentucky Space Grant Consortium.

McWaters said it was hard to explain to friends and family the unique nature of the flight.

"The whole time we were down there, I kept saying 'People from Paducah just don't do this sort of thing,'" he said. "... I mean, only 10,000 people in the world have done this, and now I'm one of them."