

KC-135 student program springs into action

Spring is in the air, as are many college students from around the country as part of JSC's Reduced-Gravity Program. More than 1,000 students have been able to experience the unique "weightless" environment of space flight in NASA's KC-135.

The Reduced Gravity Program enables 48 select academic teams to conduct science and engineering experiments aboard the aircraft to study the effects of zero g. This year, the fifth for the program, experiments ranged from investigating gas bubbles from a fuel flow in satellite fuel systems to the study of human information processing in zero g to plant pollination.

"We've had a tremendous response to the Reduced Gravity Program," said Lead Test Director, John Yaniec. "Each year, the experiments get more and more sophisticated. I've flown a lot of funded research, and some of these are as interesting as those that we've flown for established researchers."

Approximately six experiments are flown during each student mission. The students spend anywhere from six months to a year preparing their experiments for the zero g flight.

The reduced-gravity environment is obtained with a specially modified KC-135A turbojet transport. The effect of weightlessness is achieved by flying the aircraft in aggressive up and down maneuvers called parabolas. At approximately 30,000 feet over the Gulf of Mexico, the pilot pitches the plane up to a 45-degree climb attitude, leveling off "over the top" and then pitching down 45-degrees. These level offs at the crest of the parabolic arcs produce weightless periods of 20 to 25 seconds. The pilot repeats the maneuver more than 30 times enabling the students to run several repetitions of their experiment.

A typical student mission is two hours long and consists of 32 parabolas—(30 at zero g, one at lunar (1/6) gravity and one at Martian (1/3) gravity. These parabolas can be flown in succession or with short breaks between maneuvers to reconfigure test equipment. Approximately 100,000 parabolas have been flown in support of the Mercury, Gemini, Apollo, Skylab, Space Shuttle, and Space Station programs.

According to Donn Sickorez, University Affairs Officer, the Reduced Gravity Program pays back dividends to the space program, as well as to the students and schools involved.

"Students tell us that the chance to develop an idea, design and build it, fly it and then evaluate the results is simply the best way for them to learn engineering," said Sickorez. "The outreach requirement is also unique to this program. Students who have flown with us see faces light up when they visit lower division schools and recount their zero g experiences. They communicate the excitement of science, and it might just be what is needed to grow simple curiosity into a full-fledged scientist or engineer." ■



NASA JSC 2001e08790

College students from around the country as part of JSC's Reduced-Gravity Program. More than 1,000 students have been able to experience the unique 'weightless' environment of space flight in NASA's KC-135.



NASA JSC 2001e08786