

NEWS FROM WHITE SANDS

Flying High

Students from the White Sands area experience microgravity simulations

By Cheerie R. Patneau

Astronauts do it. Roller-coaster riders do it. So how can others achieve microgravity?

By catching a flight on NASA's KC-135 "Weightless Wonder."

Thirty students and their mentors from two New Mexico high schools and the White Sands Test Facility (WSTF) recently participated in an educational outreach program.

The students were selected from a competition held by WSTF and organized by Pleddie Baker, Technology and Education Outreach Officer. From the eight schools that participated, Mayfield High's "Alternative Cardiopulmonary Resuscitation (CPR) Methods for Microgravity Environments" and Las Cruces High's "Mo'Mentum" proposals were selected for the mission onboard the microgravity simulator aircraft to test their winning theories.

The two teams traveled to JSC April 19-27, where they flew on NASA's KC-135 with their teacher and a NASA mentor. Teachers Jean Irons of Mayfield High and Catherine Massey of Las Cruces High, and mentors Deb Chowning of WSTF and Mike Hallock of Washington International Group WSTF, helped the students with their experiments during flights.

"It was an experience of a lifetime for the students to learn how a real project is



designed and tested through NASA," Chowning said.

"The purpose of NASA programs like these is to show students that science is intellectually challenging and fun," Baker said. "The participants will also begin to think about what they want to do when they graduate from high school and may consider a technical field."

The Fly High Program offers students the opportunity to design and conduct an experiment under microgravity conditions similar to orbital space flight. Joe Fries, WSTF Manager, said the program, "excites

young adults to persist in their pursuit of a higher degree in the science and engineering fields. I think it's one of the finest hands-on programs: exciting and valuable."

The Mayfield High students wanted to evaluate the timing and chest compression depth using manual techniques and compare those to a mechanical device's. All students were required to complete American Red Cross CPR and NASA-WSTF Critical Flight Handling training in order to qualify for the experiment.

Michigan Instruments agreed to loan "Thumper" for the experiment. A "Resuscitation Annie" configured with an internal data acquisition system was loaned by Southwest Region II EMS, and Wyle Laboratory's Life Science Section loaned a Class III Crew Medical Restraint System.

The test matrix required human subjects to perform straddling and inverted CPR techniques and oversee the operation of Thumper for a minimum of five parabolas. Thumper was on target in both timing and compression

throughout the entire parabola.

"It was lots of fun and a great experience. I learned a lot about teamwork and then how to work together," said Justin Lambeth of Mayfield High. "The best thing was that I was experiencing science in the field not learning it out of a book."

The Las Cruces High experiment was designed to demonstrate and confirm the Law of Conservation of Momentum, both linear and angular, under idealized conditions without gravity.

Students used a Ballzooka MP 150 Nerf™ gun to launch an object into motion and then measured the masses and velocities.

The students used a combination of Newton's Laws that define the Law of Conservation of Momentum, where $M1 \times V1 = M2 \times V2$ or if the net external force on a system is zero, the velocity of the center of mass of the system is constant, and the total momentum of the system is conserved.

"The whole experience was all pretty much amazing and incredible for my senior year," said Las Cruces High Team Leader Barbara Burkholder. "I learned a lot about responsibility and even more about time-management."

Beth Petersen of Las Cruces High believed flying on the KC-135A was, "the most incredible thing I'll ever do. There was so much work to be done, that I wondered if things were going to be worth it. But I learned so much about myself, mostly that I have to strive to succeed." ■

White Sands celebrates Management Week in America

The NASA White Sands Chapter of the National Management Association celebrated Management Week in America June 3-9. Chapter President Ken Schaaf, who is a Division Manager for the Engineering Department at White Sands Test Facility, urged employees to 'make a point to recognize the good work of all business managers, especially our own at WSTF.' The Las Cruces Mayor and City Council, as well as New Mexico Gov. Gary Johnson, issued official proclamations for Management Week. Schaaf is pictured here holding those two official proclamations.



New state plan aims to clean up Houston's smoggy air

Kirk Hummel is an environmental engineer in JSC's Environmental Office. Here the pollution expert discusses the impacts of the new Texas clean air plan for Houston.

The state's blueprint to control ground-level ozone pollution in the Houston area will mean expensive changes for business and industry, and a reduced 55 mph highway speed limit for motorists next year.

Ozone exposure is a concern because it can cause permanent damage to the lungs. Even low-level exposure can cause respiratory difficulty including chest pain, coughing, nausea, throat irritation and congestion. It also can worsen bronchitis, heart disease, emphysema and asthma, as well as reduce lung capacity.

Healthy people also experience difficulty breathing when exposed to ozone pollution. Ozone pollution typically forms during hot summer weather, so anyone

spending time outdoors—including children, the elderly, outdoor workers and exercisers—can be affected.

The Houston/Galveston ozone non-attainment area had the most ozone exceedance days and highest peak ozone readings in 1999 and 2000 in the nation. Failure to meet clean air standards by the EPA deadline of 2007 could mean the loss of about \$1 billion dollars of annual federal highway funding. Other sanctions could include restricted growth on new and old businesses and possible forced lifestyle changes such as "no drive" days.

In response, on December 6, 2000, the Texas Natural Resource Conservation Commission (TNRCC) adopted a comprehensive smog plan to bring the Houston area into compliance. The goal is a 75 percent reduction of Nitrogen Oxides (NOx), a main ingredient in the formation of ozone. Nitrogen oxides form when fuel

is burned with air at high temperatures. The primary sources of NOx are combustion exhaust gases from industrial, commercial and residential sources that burn fuels.

The new regulations will affect a wide range of activities, with the largest share of NOx reduction (90 percent) coming from boilers, furnaces and gas turbines at large industrial centers. Additional NOx reductions will come from car and truck regulation via a new 55 mph speed limit starting May 1, 2002, and expanded auto tailpipe inspections. The new inspections begin in May 2002 for Harris County and 2003 for Brazoria, Fort Bend, Galveston and Montgomery Counties. Chambers, Liberty and Waller Counties will begin the new inspections in 2004.

Most of the impact at JSC will be felt in the Building 24 Central Heating and Cooling Plant. Two existing 60,000 pound per hour steam boilers are planned

for retrofit in 2003 and 2004 with ultra low-NOx burners to achieve nearly all of the required reductions.

There are several ways to obtain information on ozone pollution levels. Harris County's Office of Emergency Management manages the Ozone Notice System, where you can subscribe to receive automatic e-mail notifications of ozone watches and warnings. The TNRCC also posts real-time information on ozone concentrations from continuous air monitoring stations. The closest monitor is HRM-8 LaPorte C608, located approximately 7.8 miles north-northeast of JSC on Fairmont Parkway. ■

Ozone Notice System:
http://www.hcoem.org/Ozone_2001/pick_station.asp

JSC's nearest ozone concentration monitor: http://www.tnrcc.state.tx.us/cgi-bin/monops/daily_summary?608