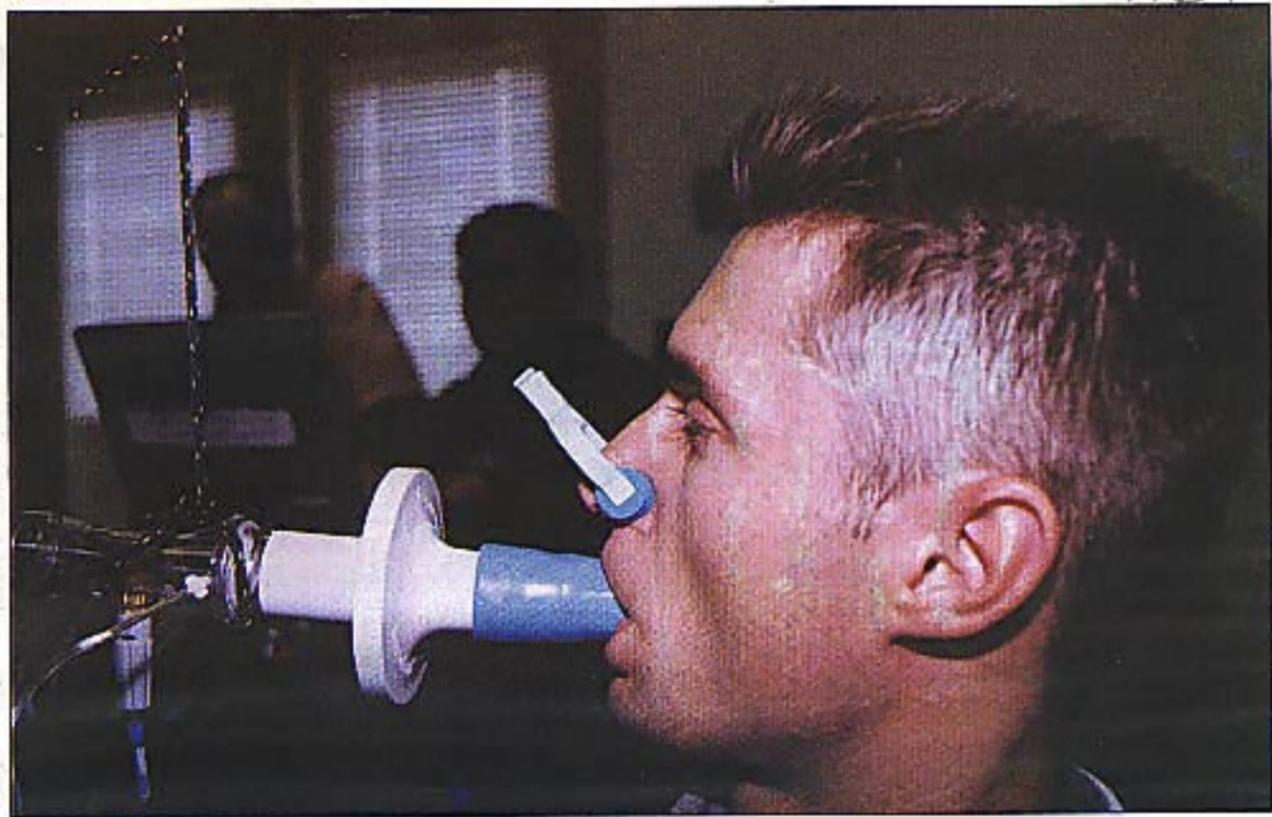


Getting a little thin up on top



Tech. Sgt. Rodney D. Owen of the 34th Operations Support Squadron has his breathing rate measured in the Army research facility at the top of Pikes Peak.

Altitude experiment may benefit flying operations

Story and photos by Staff Sgt. James A. Rush
Academy Spirit staff

Having your head in the clouds, as it turns out, may not be a bad thing. The Air Force Academy Human Performance Laboratory is working with the U.S. Army Research Institute of Environmental Medicine to study how living at low and moderate altitudes affects the ability to think and act at high altitudes.

The scientists involved hope to show living at higher altitudes makes soldiers and airmen more capable of adjusting to physical changes occurring during flying operations. A benefit of this would be that the services could expand training at higher altitudes.

Currently, regulations require the use of supplemental oxygen when flying above 10,000 feet, something not readily available to Academy glider pilots or the Wings of Blue jump team. In fact, most U.S. military's primary fixed-wing trainers and rotor-wing aircraft are unpressurized and are not equipped with crew oxygen systems, according to the experiment's background data.

"We may be able to rewrite the limits for soaring and parachute training here," said Maj. Mike Zupan, Human Performance Laboratory director. "We've had waivers before, but this will provide additional credence to those waivers."

Forty Academy and Peterson AFB active duty members, living 6,000 - 7,000 feet above sea level, were the first test subjects. Each volunteer underwent a battery of tests in the lab to determine lung capacity, the percentage of oxygen in the blood, cognitive ability and other measurable traits which the scientists feel may be affected by a sudden change in elevation.

Next, the show was taken on the road approximately two and two-thirds miles up.

The summit of Pikes Peak lies 14,110 feet above sea level. Small groups of test subjects were driven to the top making three stops on the way at 8,000; 10,000; and 12,000 feet. The oxygen content of each person's blood was checked and changes in physical condition, such as fatigue, nausea, headaches or dizziness were noted.

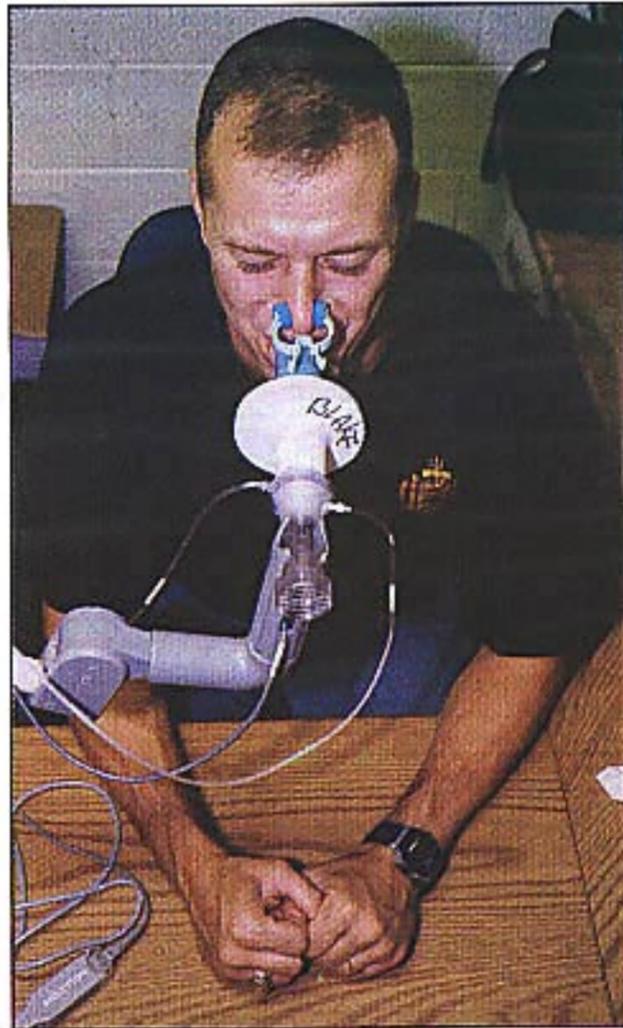
An Army research facility at the top was the climb's final destination. Inside, scientists administered the same battery of tests the volunteers took at the Academy.

The same procedure will be followed using an altitude chamber with a group of people in Boston later this year. Scientists hypothesize that the moderate level (Academy) group will have an easier time adjusting to altitude changes than the low level (Boston) group and the initial results support their theory.

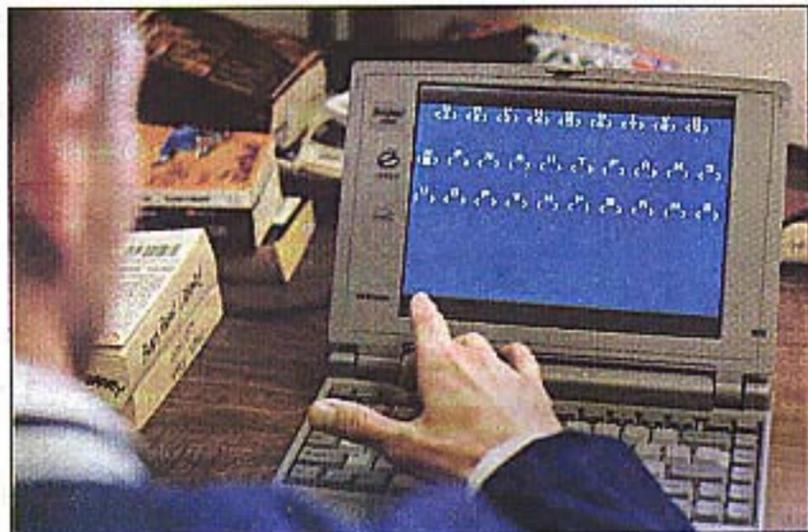
"You've got about a week's head start over someone coming from sea level," said Dr. Steve Muza, a research physiologist with the U.S. Army Research Institute of Environmental Medicine. "And it takes about seven days to lose acclimatization when going back to a lower altitude where there is no longer a lack of oxygen stimulating the body to adapt."

A second goal of the experiment was to determine what role genetics play in the adaptation process. Each test subject donated a sample of blood, which can be examined to see if he or she is preordained to adapt well or poorly because of DNA.

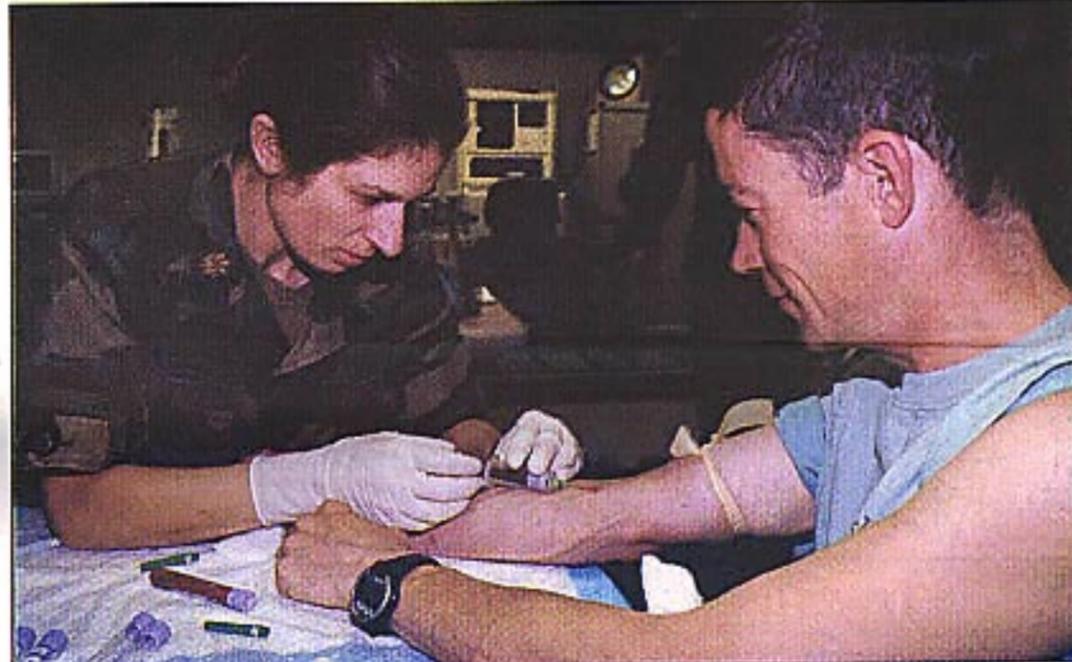
"If we know which gene makes which protein, we may be able to develop medication that help," said Muza.



Lt. Cmdr. Blake Huguenin, a calculus instructor here, strains to press all the air from his lungs to determine lung capacity.

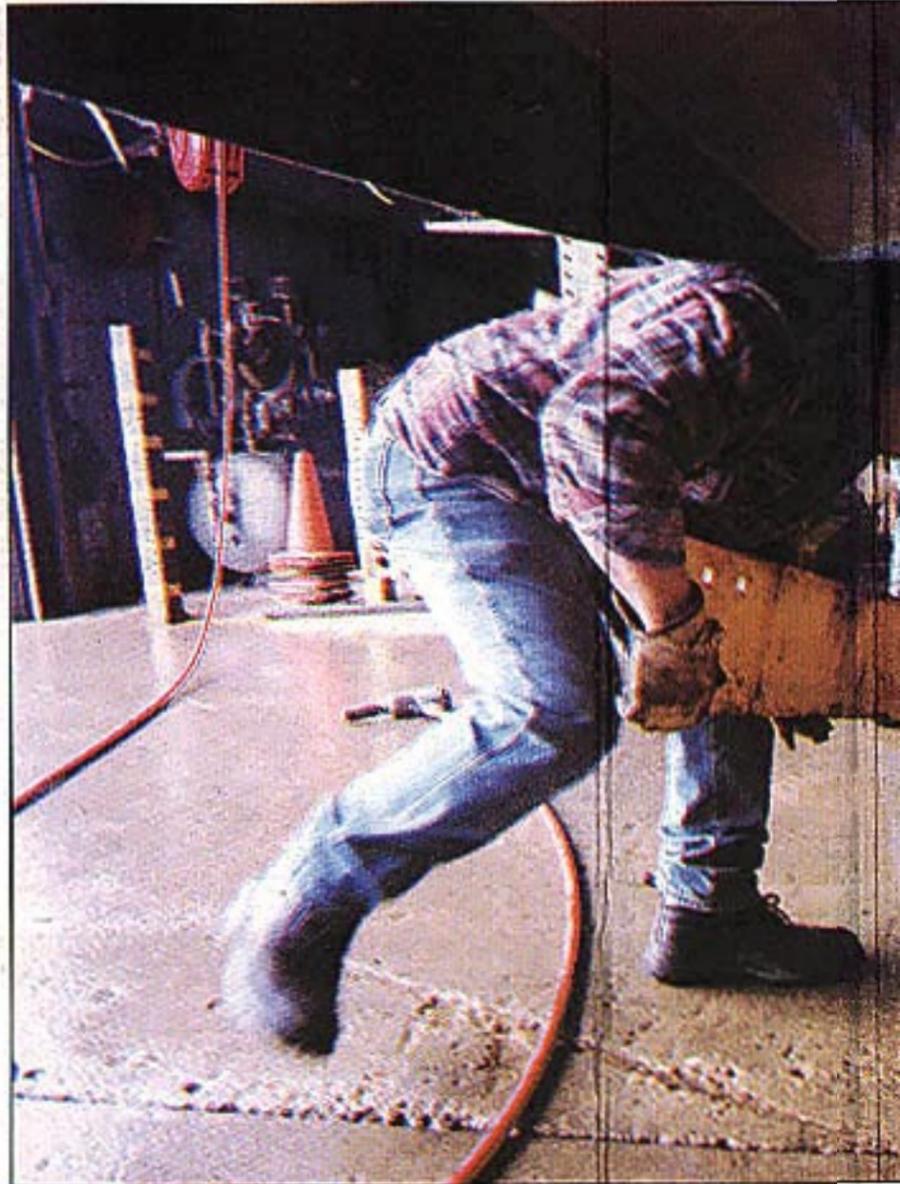


(Above) Tests were conducted at the volunteers' residential level and at the summit to determine changes in cognitive ability. (Right) Maj. Tamara McReynolds draws blood from Lt. Col. John R. Sharp, a Russian language instructor here.





Leslie Clayter uses one of the smaller plows to reopen up a sidewalk.



John Romero replaces a plow blade. The Academy snow removal team... and leaving a thin layer of ice which could make driving more hazardous.

Indomitable Snow



(Above) Gary Griego pilots one of the snow removal team's newest additions to its fleet, a Kenworth truck. (Right) The thick carpet of snow on the athletic fields in no match for Griego and the Kenworth.



Story and photos by Staff Sgt. James A. Rush
Academy Spirit staff

Twin eye beams stab through the almost light of pre-dawn hours. A monstrous shape begins to emerge and the ground shakes with its approach. Better move quickly. The side of the road is not a good place to stand when one of the Academy's snow removal behemoths rumbles past.

Mother Nature's recent weather assaults have prompted most offices to close early or open late. Mere blizzards can't keep the heavy equipment operators of the snow removal team from their appointed task however. They have 150 lane miles of priority one (primary) road to keep clear so the rest of the Academy can drive safely. The skill with which they do this has earned them the Col. Bernt Balchen Award for outstanding achievement in snow removal and ice control for 1998.

Colorado weather repeatedly gave the team opportunities to show their best stuff. The Academy recorded 67 inches of snowfall in 1998. One storm in particular however, required their peak ability.

Beginning March 18, the team maintained total vigilance for 48 hours to ensure the base remained operational during a severe blizzard. Twenty inches of snow and 40-knot winds created white out conditions that forced the closure of Interstate 25. Academy roads remained open throughout the two-day storm and were completely clear by 6:30 a.m. March 20.

"That's our norm," said Bill Feduska, horizontal repair foreman. "We pull rabbits out of a hat continuously. We worked 24 hours, around-the-clock. It's what we expected so this is a normal thing for us."

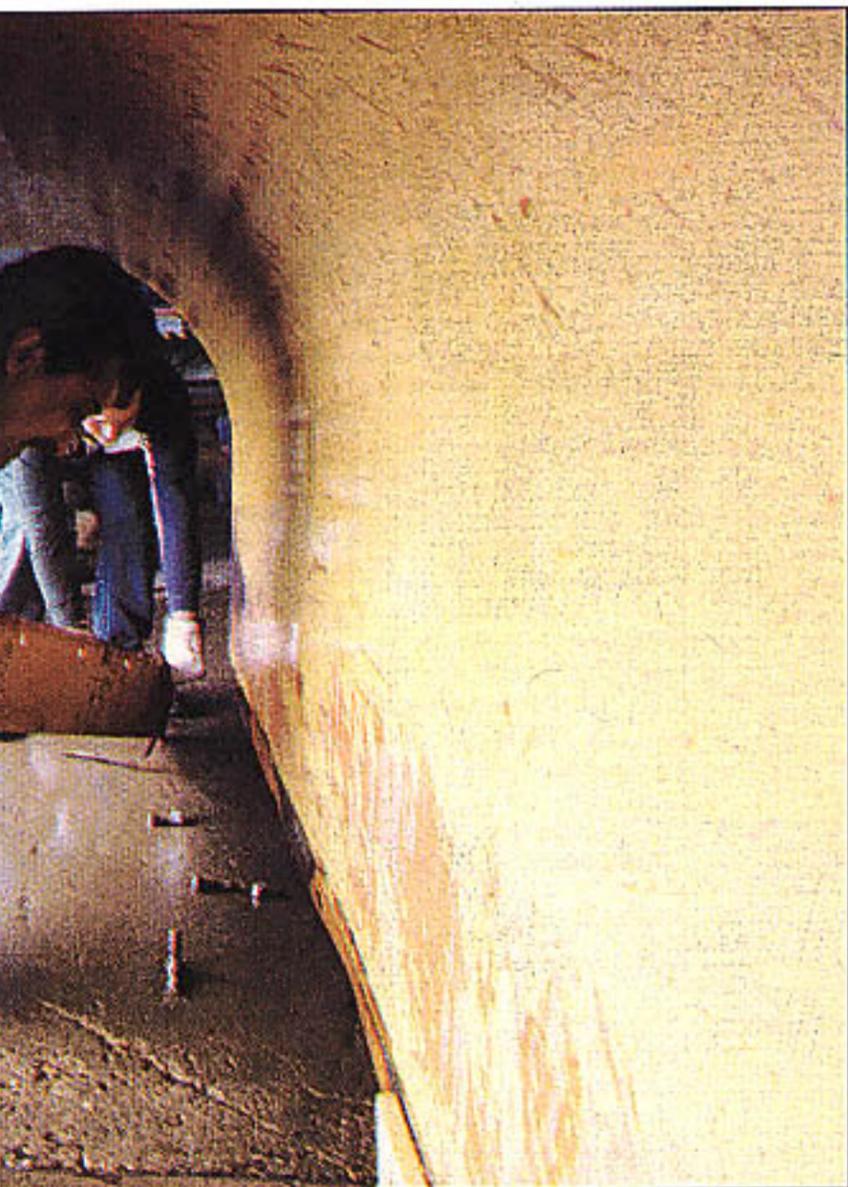
To stay ahead of the weather, a wide variety

The average plow driver... 300 miles a... freezing we... yet he is o... that stands... the Academ... Mother Natu

of vehicles are employed... latest in equipment, techn... ence. The team uses up to... satellite imaging from m... predict when they need to... to action.

"It's not just a matter... matter of how you remov... put it," said Feduska wh... removal efforts. "We've g... perature sensors on t... the... for the temperature. . . If i... go from a hard chemical... it's dropping, we can p... the snow as it's coming..."

The biggest addition... concerned, is the Sno... Academy is the Air For... foot wide snow corral. T... to the bucket of a front-



scrapes down to the road surface instead of skimming across the top

owmen

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mouthed monster that clears parking lots far more quickly than previous methods, according to Feduska. The Academy previewed the Sno Pusher for the Air Force and reported favorably on it recently.

"We did the test and have recommended approval across the Air Force," said Feduska. "I think anyone who is on a snow situation needs one of these critters. It basically triples the capacity of a large front end loader."

Another weapon in the war on ice and snow is FreezeGuard-Zero, a deicing chemical used to return snow and ice to its liquid state.

FreezeGuard is a magnesium chloride compound. Chloride is a salt which induces the reaction that melts snow. Magnesium is a micronutrient needed in soil.

"FreezeGuard contains corrosive inhibitors that keep it no more corrosive than tap water," said Feduska. "It's the least harmful product we've found for snow removal."

The current season hasn't cut the reigning champs any slack. Several storms so far have piled about 75 inches onto Academy roads, however operations has only seen minimal impact - folks sent home early or told to come in late a couple of times.

The priority one roads which receive the most attention from the plows include the roads to fire stations, from family housing to hospital and main ways for folks to get to work.

In a heavy snow, one to two inches per hour, a single plow can't keep up, said Feduska. On an average night, plow drivers may log in excess of 300 miles, all of the same short stretch of frozen road, during a 12-hour stint behind the wheel.

"They lose a whole lot of sleep and deserve all the credit in the world," said Feduska. And for 1998, the Air Force agrees.



Michael Huffaker uses a grader to clear snow from the Base Exchange parking lot. The grader's maneuverability is an asset when it comes to steering around parked cars.



Soon after a storm, this snow and ice-free road stands testimony to the plow driver's effectiveness.