

## Vomit Comet

Aggie engineers earn chance to use NASA technology for microgravity project

By Amelia Williamson  
THE BATTALION

Last week, five Texas A&M students had the chance to experience the sensation of weightlessness as they flew aboard NASA's KC-135 aircraft, commonly known as the "Vomit Comet," to conduct their microgravity, or near zero gravity, experiment.

Senior aerospace engineering major Grant Kemper was the team leader, and the team members included senior aerospace engineering major Jonathan Russell, sophomore electrical engineering major Joyce Varghese and freshman aerospace engineering major Maria Liberto.

The team's experiment was titled "Wind Sheared Waves on Thin Films Under Microgravity," and focused on the effect of gravity on the behavior of wind sheared waves. Wind sheared waves are the waves produced when air flows over a surface of liquid.

The team built a wind tunnel, a device that simulates airflow, to test the effect of gravity on wind sheared waves produced on a thin film of oil, according to Kemper. The team's goal was to test how different amounts of gravity affect the waves formed in the oil.

The team wanted to observe the ripples made in a thin film of oil when placed in the wind tunnel to see how the ripples changed in a microgravity environment.

"This information on the change in wave shape is important to many applications, from applying adhesives in zero gravity to designing an efficient radiator for a nuclear power supply," Kemper said. "Understanding the physical models of wave behavior in zero gravity will be of great importance to future endeavors in space."

The team could observe the effect of normal gravity on the waves from Earth, but it needed an environment where it could test the effects of microgravity. NASA's KC-135 provided the perfect microgravity testing environment.

The KC-135 simulates a weightless environment by flying in a parabolic, or U-shaped, path. The plane starts off flying upward at a 45-degree angle. It then follows the path of a parabola and dips back down, descending at a 45 degree angle. For the 15 to 30 seconds the plane is at the top of the parabola, the plane experiences free fall, which creates a microgravity environment within the plane, Liberto said.

"This up and down motion is similar to a roller coaster," Kemper said. "At the top of the hill you feel like you are coming out of your seat, and at the bottom you feel like you are being crushed. The KC-135 experiences 0-g at the top (of the parabola) and 2-g at the bottom."

The team submitted a proposal to NASA to apply for a time slot aboard the KC-135 to conduct their experiment.

The team had to send in a detailed proposal explaining what

we would like to test in a microgravity environment, how it is important for the future, and how we would plan to test it," Varghese said. "There are committees of scientists at NASA who read through all the proposals they receive and approve the ones they like and think would provide useful data for the future."

A few months after the team submitted its proposal, NASA notified the members to say that they had been selected to perform their experiment aboard the KC-135.

"Our team first wrote a proposal last fall," Russell said. "The proposal described our project ideas and what applications this would have. We found out in December that we had been chosen as one of the participating teams."

The team finished designing and building the equipment it needed in its experiment for its two assigned flight days. Two team members flew in the KC-135 with the experiment on April 23, and the other two team members flew on April 27.

During the flights, a video camera recorded the waves created on the film of oil in the wind tunnel as the plane experienced different levels of gravity. The plane went through many parabolic flights so the team could perform its experiment several times to check for consistency.

Once the team finishes analyzing the data it collected during the two flights, it will write a final report on its results and will begin an outreach campaign to educate others about the experiment and what the members learned, Kemper said.

The team members were thrilled to have had the opportunity to experience floating around in a weightless environment.

"The feeling of weightlessness is unlike anything I have felt before," Kemper said. "The sick feeling of falling quickly goes away and the euphoria of flying like superman takes over your body. I could not stop smiling."

Liberto said it is difficult to explain what it is like to be in a weightless environment.

"There are no words to describe the feeling of weightlessness or the experience," Liberto said. "It's something

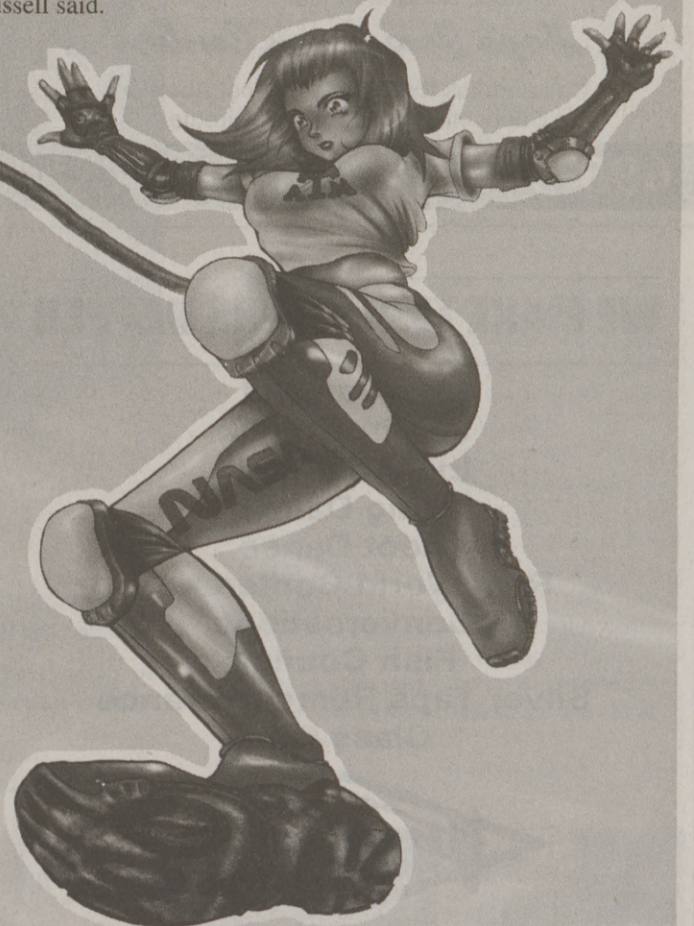
so amazing that it cannot be told with words. You just have to experience it for yourself."

Varghese also thought that the feeling of weightlessness was amazing.

"In the past, flying was something I could only dream of," Varghese said, "but after flying aboard the KC-135, floating in the air became a reality."

Many people dream of being able to float through the air, but few people actually get the chance to do it.

"Riding on the KC-135 was the experience of a lifetime," Russell said.



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