

NASA center develops 'hot' new technology

Center's research developments include high-tech sensors, wireless security

By Tom Howell Jr.
April 27, 2005

Sending a human to Mars, waging a successful war and securing wireless communication have something in common — each is an application of technology created at the university's NASA-supported research center.

The Center for Satellite and Hybrid Communication Networks, founded in November 1991, is bringing the university to the forefront of wireless technology research by developing sensors useful in space exploration and military defense in its labs in and around the A.V. Williams Building.

The sensors, the size of two AA batteries, are portable and can be tossed into strategic places of a battlefield, measuring factors such as enemy tank movement, weather and terrain, said Dion Blazakis, a graduate student and CSHCN researcher.

The center is one of 17 commercial research centers sponsored by NASA. Its team of graduates and undergraduates uses an annual \$8.6 million to research wireless satellite networking for NASA and defense divisions such as Defense Advanced Research Projects Agency and the U.S. Army Research Laboratory. The center also develops technologies for various private companies.

"We've made an impact because we work very closely with industry," said John Baras, the center's director and an electrical engineering professor. "We have a very unique collaboration."

The sensors will benefit the military, Blazakis said.

"A soldier will have a PC and get sensory data on demand," Blazakis said. The center is also developing a smaller, quarter-sized version of the sensor.

The sensors also have applications in outer space, Baras said. Rovers on Mars or the moon can use the sensors to survey conditions and send information back to NASA over satellite networks. This combination of robots and satellites could involve humans as well, monitoring health conditions during a potential mission to Mars, Baras said. Sensors are becoming more important and can be found in cars and aircraft, Baras said.

"Sensors are becoming very hot," he said. "Universities have huge [sensor] programs now and it's a quite popular field."

The center is also developing secure wireless communications. Instead of connecting to a standard hub device in a room, CSHCN's networks use a set number of cooperating computers. If a computer user in the middle of the chain is not cooperating, the other users will know, said Karl Seamon, a CSHCN research assistant who graduated with a computer science degree last spring.

The need for heightened wireless security is necessary because today's hubs leave unencrypted information vulnerable to hackers, Blazakis said.

"In wireless, you can see everything," he said.

CSHCN is using mathematics found in biology and physics as models to develop its network technology. The way insects interact and how particles work together can be applied to wireless network building, Baras said.

"There is mathematics behind it," he said. "There are algorithms we can use in technology."

CSHCN's wireless and satellite hybrid systems caught the eye of officials at DirecPC, a computer-based technology that is the offshoot of the widespread DirecTV. DirecPC uses satellites to provide Internet connections based on technology developed at the university.

The center came to the university after it won a competition held by NASA in 1991, Baras said. Universities had to submit a research proposal to acquire a center; this university and Florida Atlantic University were selected to host the center. Since then, CSHCN has provided a valuable experience to its roughly 70 graduate and 15 undergraduate researchers each year, with 15 to 25 of the center's students getting industry jobs each year, Baras said.

"It's a better education when it's not just in the classroom," Baras said.

Note: Most newer browsers don't need a print-friendly version of this article. Just click **File**, then **Print** from your browser's menu at the previous page.