

NOT ON AUTOPILOT

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Rivier graduate Pamela Munro's study of cognitive function helps improve aviation safety around the world



Pamela Munro '99 loves aviation. She grew up in a family with airplane pilots and mechanics and earned her pilot's license in 1994. But it's her passion for psychology that makes the skies safer for frequent fliers.

As a Human Factors Specialist for Boeing Commercial Airplane Company, Munro works with engineers to ensure that new flight decks and maintenance interfaces are designed to take advantage of pilots' and mechanics' cognitive strengths and minimize human error. "Engineers don't always realize that automation can lull people into complacency," she says. "People are expected to be able to jump in when something goes wrong, but if they haven't been getting feedback, they lose the ability to analyze the situation."

Seemingly simple things like nomenclature can make a measurable difference in a pilot's ability to respond to an unexpected event. Munro explains that air traffic control around the world is conducted in English; all controls are labeled in English. Making sure that names are consistent on all planes can help prevent accidents. "In time sensitive situations, slightly different names could confuse a pilot whose native language is not English," she says.

Munro is currently reviewing systems for the Boeing 787, slated to fly in 2008. The new plane will have more computerized systems, such as electronic circuit breakers. To facilitate repairs, Munro makes sure that the new design matches the mental model that mechanics have worked on in the past. She also works with Boeing's accident investigators to evaluate human performance in airline accidents and determine how similar accidents can be prevented.

Prior to accepting the job at Boeing last year, Munro studied human factors for NASA. She says that in the human factors field, her experimental psychology background and ability to create objective research designs is an asset. She frequently conducts research when new problems come up that current literature doesn't cover.

Munro had always been interested in psychology and started her undergraduate work at the University of New Hampshire, but had to put her studies on hold. When she was ready to finish her bachelor's, she said that Rivier really facilitated nontraditional students. "It can be hard to find the courses you need in the evening at some institutions," she says, but was able to finish in two years at Rivier, graduating in 1999.

A few months later, Munro packed as much as she could into her Honda Civic and made the six-day drive to California, where she didn't know anyone, to continue her studies. Though she had been offered a tuition waiver and a teaching stipend at the University of Massachusetts, she was attracted to San Jose State University's affiliation with NASA's Ames Research Center in Moffett Field, CA. She

loved the opportunities SJSU's master's in experimental psychology program offered. She says, "The university's cooperative agreement (with NASA) allows students to bring up ideas and initiate projects—if they can get funding, they go."

For her master's thesis, Munro focused on pilot-mechanic communication, collaborating with different airlines. She points out that social and cultural differences and different styles of communication can present challenges to getting proper repairs or pose obstacles in diagnosing a problem. "Mechanics are inside the guts of the airplane, pulling them apart, pilots are dealing with those systems at 35,000 feet doing things mechanics don't do," she explains. Several airlines have incorporated Munro's research into training for new captains.

Munro's research findings have also been published in the *International Journal of Aviation Psychology* and in the 2004 Safety Across High-Consequence Industries Conference proceedings. FedEx's in-house magazine for flight crews has included Munro's articles to show practical applications of human factors research—"Driven to Distraction" explains how interruptions and attempts to multitask can cause even the most experienced flight crews to make mistakes.

"People are good at being creative," Munro says, citing Apollo 13 as an example of human problem-solving. Studies show that people are not good at just sitting and watching a screen or monitoring something; there is a tendency to get distracted. Aviation is not the only industry concerned with human factors research. Healthcare, computer technology, power plants, communications, and manufacturing also rely on human factors to find ways they can become more effective.

Munro says she enjoys expanding her own knowledge of human factors and how it's applied. "Decisions we make impact pilots around the world," she says. In an industry where man and machine rely on each other, Munro determines how to assign and design functions around what each does best. ■

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