

BullEx Digital Safety Makes Hot Product Out Of Fire Extinguisher Training

Rensselaer Polytechnic Institute



Not all technology breakthroughs spring from the brains and laboratories of those with a Ph.D. Sometimes undergraduates have pretty darn good ideas, too.

That's the whole point of the Inventor's Studio at Rensselaer Polytechnic Institute (RPI) in Troy, N.Y., where students came up with a live fire extinguisher training simulator that ultimately led to the founding of BullEx Digital Safety.

“ *The goal of the course is to define problems that most people don't even know exist. And then invent and patent solutions.*

Burt Swersey, RPI faculty member

But the students in Swersey's class didn't start out seeking to create what has come to be known as the Intelligent Training System™, a safe and relatively inexpensive technology that can detect the accuracy of trainees' sweeps of compressed air and water from its SmartExtnguishers™ onto what looks like an oversized camping stove.

Company officials say the system that evolved is an ideal teaching tool, thanks to an onboard control system that realistically and automatically varies the propane-fed flames to simulate a variety of fire types. The system also allows the trainer to control the flame range, score and rate trainees, and vary the degree of difficulty.

Experts note that fires account for more than \$9 billion in property loss in the U.S. each year. Yet the majority of these fires can be stopped before growing too large with a single extinguisher, operated by a trained user.

Better training in the use of fire extinguishers is greatly needed, they say, because most homeowners — if they have them at all — don't know how to use them. In addition, federal law requires industries to train workers how to use their fire extinguishers.

Students as Inventors

Swersey, who has been teaching in the Inventor's Studio for the past eight years in the department of mechanical, aerospace and nuclear engineering, gives most of the credit for the Intelligent Training System to two former students — Paul Darois and Steve Galonska — who began working on a related project when they were sophomores at RPI several years ago. Swersey is also listed as a co-inventor on the patent application, as are former RPI students John Blackburn and Travis Bashaw.

"I believe this product will save lives and prevent property damage. That's a pretty great thing," says Swersey, who has started and run several medical device companies in New York. A Cornell University graduate, he began his career at Polaroid and is a devotee of Edwin Land, who pushed employees to find unrecognized needs and create products to solve them.

Swersey says Darois and Galonska first designed a cook stove that would turn itself off if a fire erupted. But many other inventors had worked on that problem and obtained patents. So they toyed with making race cars and airplanes safer from fires. Eventually, they looked at fire extinguishers and found that the system for training users could be improved significantly.

"Basically, the state of the art was to ignite kerosene in a container in a parking lot and have trainees use a fire extinguisher to put out the fire. It's expensive, \$20 plus to recharge the extinguisher, makes a mess and provides no metrics of the test," he says. "And that's how it's still done around much of the world."

Swersey says it was important that Darois and Galonska did not "fall in love" with their first idea.

"Iteration is the key," he states. "Rarely is the first idea the winner. You need successive iterations and they kept working until they created a design that was far better than what exists."

Swersey says he distinctly remembers the day a few years back when Galonska came into his class and proudly showed him a sensor he had purchased for about \$7.

"He said 'Hey, look at this' and proceeded to demonstrate it," he recalls.

Galonska stood 15 feet from his partner Darois and ignited a cigarette lighter. When Galonska pointed the sensor at the flame, "low and behold" the simple little circuit he had built went off, Swersey says.

"The sensor could see the cigarette lighter 15 feet away," he says. "That was a key moment. And it resulted from their attitude — constantly striving for improvement and taking initiative, rather than waiting to be told what to do. They attacked problems with optimism and confidence that they could learn any new technology on their own and would do

whatever was needed to succeed. That is the most important lesson.”

They continued improving the mechanical and electronic design and running a succession of tests. And rather quickly, the training system, which uses advanced sensors embedded in the burner in combination with the control system to determine the students’ technique, was ready to be shown to users.

BullEx: “An Inspiration”

Other key players in the BullEx story are volunteer firefighter Ryan O’Donnell, who is now the company’s CEO, and John Blackburn, electrical engineer and head of technology. O’Donnell and Blackburn took over the company, when Galonska and Darois chose to pursue other careers after they graduated. O’Donnell and Blackburn were also in Swersey’s class and overlapped with the original inventors.

Phil Weilerstein also played an important role. He is the executive director of the National Collegiate Inventors and Innovators Alliance (NCIIA), which gave out grants worth nearly \$30,000 to the fledgling company. NCIIA is supported by the Lemelson Foundation. Its namesake, Jerome Lemelson, was a prolific inventor.

“BullEx is an inspiration that we have broadcast widely in our network to make it clear to other faculty that they need to do the kinds of things that were done for this team and to look for students who can be nurtured the way these students have,” Weilerstein says.

“They killed a lot of birds with one stone and went from the classroom to a company,” he says. “O’Donnell pulled together a team, took a great idea and made this happen with determination and know-how. But it wouldn’t have happened without the RPI environment.

“Their story exemplifies the opportunities that are there for students in higher education for locally funded and developed innovations that can have a positive impact on the local economy without any large federal grants or venture capital funding,” he says.

Charles Rancourt, who heads Rensselaer’s Office of Technology and Commercialization, says he, too, is inspired by the success of BullEx and its student entrepreneurs. Rancourt’s office helped the inventors with the patenting process and coordinated the licensing of the technology to BullEx.

“They were very successful at winning business plan competitions to help launch the company,” he says. “But the thing I would emphasize is that this was a student project. They took an invention that had commercial potential and then had the initiative to start a company that is the ‘real deal’ with customers all over the country.”

O’Donnell, who remains a volunteer fireman, said the company earned about \$150,000 in grants and awards from the NCIIA and a number of state and local business plan competitions. It also took out a “significant” loan to get off the ground in 2005.

BullEx, which is based in Albany, N.Y., has 30 employees and is making a profit, he says. It now has customers in virtually every market and industry group, including the U.S. Army, General Electric, Harvard University and the state of Alaska.

“We’re making a difference in a lot of positive ways,” says O’Donnell, who earned his degree from RPI in engineering. “From here, our aim is to keep growing, capitalize on new innovations and offer systems similar to the fire extinguisher training technology that can provide a real and cost-effective benefit to customers.”

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