

# Engineering a rescue

March 15 2017, by Mary Helen Stoltz

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Cody McKellips, a junior in aerospace engineering at Missouri S&T, demonstrates the prototype of his Last Chance water rescue device. Credit: Missouri University of Science and Technology

The night Brian Hunt died, volunteer firefighter Cody McKellips vowed to find a better way for fire and rescue teams to speed up water rescues, particularly as flood waters rise.

McKellips, a junior in aerospace engineering at Missouri S&T, was working with the Walnut Grove Volunteer Fire Department when storms caused massive flooding in the Springfield, Missouri, area. Hunt became the 14th victim of the flood when his truck was swept off of a Route H bridge into the Pomme de Terre River the day after Christmas in 2016.

"It was flooding that night all around Springfield, Missouri," McKellips recalls. "It was around 40 degrees. Hunt was in the middle of the river, which at that point was probably 200 feet across," McKellips says. "We were so far away, and you could see the water rise – it was happening so quickly – and we weren't able to get enough equipment to them. We couldn't get to him."

The next day, McKellips and his father, Dr. Tom McKellips, a retired Springfield firefighter and now a volunteer firefighter in Walnut Grove, sat down at their kitchen table and started pitching ideas to help fire departments avoid losses like this in the future.

"Volunteer fire departments don't have very good equipment, but they supply rescue services across most of the United States," McKellips says. Large municipal fire departments may have rescue boats, but they can take 30 minutes or more to mobilize. Some send a ladder out over the water. Others use a device similar to a Frisbee with a rope attached, but those can only travel 50 feet or so, he says.

By the end of the night, the McKellipses and partner Matt Halaschak, an electronics expert, had plans for a prototype of a water rescue device. And before long the three formed a non-profit company to manufacture the device – Global Rescue Systems.

The prototype flotation device, called the Last Chance, has three primary components – a specially designed stand, a pneumatic launcher and a projectile. The projectile, which looks a bit like a foam swimming pool

toy, is the flotation device. The device weighs about 30 pounds and costs just over \$100 to build.

McKellips' engineering background helped him evaluate the mechanics of materials, safety, price optimization, aerodynamics and rocketry concepts.

"It's fairly simple," McKellips says. "You use compressed air to launch the projectile a decent distance." Right now, the device is capable of launching the flotation device about 250 feet. The team is working on improvements that will extend that reach to well over 500 feet.

"The device is pulling a rope, so it is basically the opposite of a rocket – instead of losing mass, it's gaining mass," he says. "But you've got to be able to pull them in."

The Last Chance prototype is designed to not automatically retract – and for good reason. There is a lot of debris in the water during a flood, McKellips says, and that would make a self-retracting device difficult to use. It would also add to the cost of the [device](#), which McKellips says isn't part of the plan.

A main goal of the project is to make these devices so inexpensively that they can be provided at little or no cost to fire and rescue teams. They have provided a prototype to the Pleasant Hope Volunteer Fire Department and the company is raising funds to pursue a patent and begin larger-scale production. They're also working on more advanced versions of the Last Chance and other [rescue](#) devices.

Provided by Missouri University of Science and Technology

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