Experiment drifts down on Tolu from St. Louis

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A few balloons, a Mountain Dew bottle and some high-tech equipment has made for an interesting story for Leana Riley.

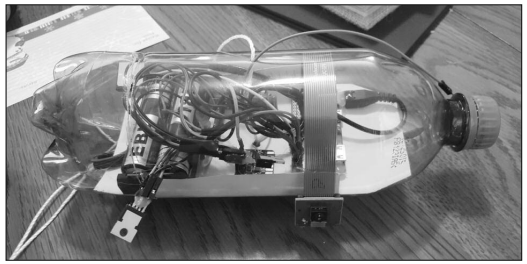
Earlier this month, the local woman located in a remote Tolu field a collection of electronic monitoring equipment stuffed inside a plastic soft drink bottle and carried by helium balloons. The homemade device – a science experiment from a pair of St. Louis area amateur radio operators – was designed to record various data in flight with a tiny onboard computer, camera, GPS, temperature sensors, WiFi, radio transmitter and power supply.

Riley didn't just happen upon the gadget. While working earlier this month as a receptionist in the sheriff's department, a phone call from Eric Powell – one of the owners of the equipment – alerted her to the find. With approximate GPS coordinates provided by Powell, she and a group of other volunteers combed the Tolu area until they located the out-of-place object in a familiar field.

Powell and his science partner, Mike Sipin, were ecstatic at the news.

"We were like, wow, this is amazing," Sipin said last week from St. Louis, running down a list of searchers from Crittenden County Sheriff's Department that included Riley and her boyfriend, Ben Beachy. "They've been fabulous. Everybody got drawn into this."

And that was the entire point of the experiment, Sipin explained. He and Powell were inspired by a mentor on the West Coast who has carried out similar projects in order to promote STEM, an acronym for science, technology, engineering and math.



SUBMITTED PHOTOS

At far left top, Leana Riley of Marion is pictured with Eric Powell of St. Louis with a high-tech experiment Powell and science buddy Mike Sipin launched from the St. Louis area and tracked to a Tolu field. At far left bottom, "Warpig II," as the duo dubbed the device, was a Mountain Dew bottle that carried a $5 computer, camera, GPS, WiFi, temperature sensors and power supply. At left, Sipin shows off the rather low-tech flight engineering that was simply helium-filled balloons. Above, one of the scores of photos taken by Warpig II shows downtown St. Louis and the Gateway Arch at the center overlooking the Mississippi River.

Judging by Riley's enthusiasm as she tells her story, the amateur scientists succeeded.

Dubbed "Warpig II" by Powell and Sipin, the contraption was their second attempt to launch a payload of sensitive equipment miles into the air simply to take readings. The first go at it resulted in an unsuccessful practice run, as no data was retrievable.

"This time, we had a bunch of redundant engineering," Sipin said, contrasting Warpig I one with its successor.

Even though the flight path was off by around 150 miles, Warpig II exceeded expectations.

"We just got excited, as geeks and nerds, and love this crazy engineering challenge," said Sipin. "We were ecstatic for three days."

The experiment was launched June 3 with a $5 Raspberry Pi computer driving the high-tech electronics. The flight engineering was a little more old world – enough helium pumped into every-day party balloons found online to carry it aloft until freezing temperatures in the troposphere popped the balloons and sent it drifting back down to earth on a parachute.

After launch, Powell and Sipin intended to track it a few short miles by radio telemetry from the onboard transmitter. But upper-level winds caught the device and carried it southeast faster and further than the two ever imagined.

"We wanted it to go up really quick, have it pop and have it come back down, but it decided to take off and go, go, go," Sipin said. "We couldn't catch it going 55 mph on the interstate. We thought, we really don't have a chance of catching this puppy."

So they let it drift, returned home and followed it through radio and WiFi tracking. From its last transmission about 300 feet off the ground, they were able to plot the remainder of Warpig II's course and give the sheriff's department an approximate location.

When Riley found it, the liter bottle shell was cracked, but all the equipment was intact. From it, Powell and Sipin were able to download amazing overhead shots of downtown St. Louis and the rural areas along the flight path, temperature readings inside and outside of the bottle to test their thermal insulating, speed, height and distance. In fact, the balloons lifted the equipment amazingly to almost 6 miles high where minus 17 degrees Fahrenheit air temperature burst the balloons. It was moving at 53 mph at the time they gave up the chase.

"It's amazing it ended up here," Riley said.

Powell became the point man on the adventure, and drove down from St. Louis to meet Riley and collect the equipment.

"We got a lot a good data out of it," Powell said, and "some beautiful pictures of the (Gateway) Arch and city."

Powell said the duo has plans for additional missions, but they don't expect them to go quite as far as Crittenden County. And Sipin said what is amazing is the relative low cost of such an elaborate experiment.

"With the parachute, it was probably about $85," he said. "Literally, we used off-the-shelf everything."

That he added, makes the experiment super affordable for the classroom or other amateurs fascinated by science.

"It's really got a lot of neat (possibilites) for kids and STEM," he said. "Because of this story, we have more people interested."