Tracking with ZigBeef

By Debra Levy Martinelli
Photos Provided

3098798230728400

Student entrepreneurs at OU developed a wireless technology that enables modern-day ranchers to monitor their herds by means of ear tags containing each animal's entire life history.

Serendipity.

History is replete with examples of it: discoveries made while searching for something else. The antimicrobial properties of penicillin were said to have been discovered when Alexander Fleming was cleaning his laboratory and noticed the organism had contaminated one of his old experiments. Silly Putty was created during the search for a rubber substitute during World War II. 3M's Post-It Notes resulted from two discoveries six years apart: The original adhesive was invented by one employee, while another conceived of the idea to use bookmarks with it while contemplating his church hymnal.

continued

ZigBeef founder John Hassell (second from right) inspects the ZigBeef ear tag on Blackie, an 1,800-pound research Angus steer at an Oklahoma State University trial.

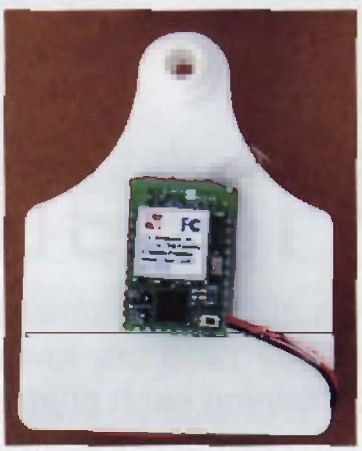
John Hassell has his own tale of serendipity.

In fall 2004, Hassell was working on wireless sensor networking technology as a doctoral student at OU-Tulsa. At the same time, the U.S. Department of Agriculture was planning to adopt a national electronic identification system for cattle. Meanwhile, then OU-Tulsa President Ken Levit was spreading the word about Oklahoma's first Donald W. Reynolds Governor's Cup Collegiate Business Plan Competition.

For Hassell, the three occurrences spelled a unique opportunity to create ZigBeef LLC, a start-up company based on his long-range wireless cattle ear-tag identification system.

With the engineering part of the project well under way, Hassell recruited three other engineering students with business expertise to help him formulate the Reynolds Cup plan. Levit served as the team's adviser and connected it with members of Oklahoma's venture capital community, who served as informal advisers.

"The transfer of technology created in our labs by our students to the business marketplace will have a definite impact on the future of industry in our state and the world," says Levit. "As a university, we are excited to nurture entrepreneurship in our students. John Hassell is the perfect example of a student taking an opportunity and an idea and growing it into a successful corporate venture."



This early prototype of a ZigBeef tag attaches a circuit board to a standard, visual-only cattle ear tag. Future versions are expected to be smaller, quarter-sized button-style ear tags.

The road to that venture began when the ZigBeef business plan won big at the Reynolds Cup competition, earning second place in the graduate division and capturing the prize for the best use of computer technology. In a span of mere months, Hassell parlayed the award-winning plan into a career path.

A risky choice, to be sure. As a newly minted doctor of philosophy in engineering, Hassell could have pursued a high-paying job in industry or an academic post at a major research university. Instead, he chose the entrepreneurial road, spending his days testing, analyzing and refining the tracking system, negotiating terms with potential collaborators, and conducting his own marketing and public relations campaigns.

As entrepreneurs like to say, "he's got the fire."

"Entrepreneurs are unconventional but confident risk-takers who aren't afraid to fail. They have an unshakable conviction that they will succeed, and that's what drives them," says Dan Davis, OU's associate vice president for Technology Development, who works closely with Hassell to ensure the ZigBeef intellectual property is adequately protected. "John is definitely one of them."

Another big plus: Hassell knows his market.

"There are some 96 million head of cattle in production in the United States. Nationwide, the cattle industry is a $35 billion business; in Oklahoma alone, it has an $8 billion yearly direct and indirect economic impact," explains Hassell, who grew up on a commercial cattle ranch in central Oklahoma. "Various techniques of tracking animals have been developed over the years, but recent mass production of affordable radio sensor technology chips has opened up new possibilities. A marriage between this new, inexpensive long-range sensor technology and the cattle industry seemed promising."

For decades, ranchers in the United States have used visual-only ear tags to numerically identify cattle. These tags have pre-printed or permanent-marker handwritten numbers that have room for a limited number of digits and only can be read from a maximum distance of a few feet. Recently, beef producers have begun applying short-range radio frequency ID tags to their cattle. Using a reading device placed a few inches from the animal, hundreds of identifying digits can be read from these short-range tags almost instantaneously. With only inches separating human and animal, however, the short-range tags still do not allow for

accurate data retrieval at a safe distance from the sometimes aggressive and skittish animals.

The wireless ZigBeef tracking technology, on the other hand, can read identification numbers from distances of 100 to more than 300 feet. The tags communicate with an inexpensive handheld or vehicle-mounted reading device that can then relay the identification numbers to a laptop computer or PDA. This system enables a rancher to log each animal in proximity or even get an instant tally on an entire herd.

The ZigBeef system does more than just count, though. Each tag gives beef producers access to thousands of characters of on-tag data memory, through which an animal's whole life history—including birth date, parentage, vaccinations and medications administered—can be recorded. In addition, such physiological data as the animal's body temperature can be sent over the wireless ZigBeef network.

Cattle identification information is more important than ever since September 11, 2001, when food safety and homeland security became part of the national consciousness, prompting the USDA to mandate the National Animal Identification System, assigning each cow, bull and calf a unique, 15-digit number. The NAIS is expected to be operational by 2007, with full producer participation by 2009. ZigBeef products can help the cattle industry comply with a method of accessing a virtual biography on every animal in their herd.

"The USDA's goal is to be able to access an animal's complete premise history within 48 hours," says Hassell. "If a member of a herd were diagnosed with mad cow disease, for example, the government would have a record of everywhere the animal had been in its lifetime and could immediately initiate a quarantine and investigation."

Team ZigBeef Scores

The ZigBeef LLC management team won big in two recent prestigious competitions.

In March, ZigBeef took first runner-up honors in the inaugural Big 12 New Venture Championship in Dallas, where teams of graduate and undergraduate students presented business plans for new ventures based on technologies developed at Big 12 schools. Sponsored by the Big 12 Center for Economic Development, Innovation and Commercialization, the competition was held in conjunction with the conference's basketball tournament.

ZigBeef's impressive showing led to an invitation to participate in the 23rd annual global Moot Corp Competition at the University of Texas at Austin in May. Dubbed by *Business Week* "the Super Bowl of world business plan competitions," Moot Corp simulates the real-world process of raising venture capital for new companies.

ZigBeef competed against 29 graduate student teams from across the United States and around the world, finishing in the top 10 overall and walking away with "Best Product" honors in its division.

A prototype ZigBeef tag is attached to the ear of an Angus steer at the OSU trial.

The ZigBeef tracking system is better suited for all these functions than its competitors, Hassell says, for two reasons. First, the distance between ear tag and reading device is much greater; second, the reading accuracy rate is far higher.

An instructive example of the potential impact of the device on the beef-producing industry can be seen at the Oklahoma City stockyards, the world's largest cattle auction market, where some 17,000 animals can run through one confined auction arena during an 18-hour period. That translates to nearly 1,000 animals an hour or about 16 animals a minute.

"With short-range tags, a handler would have to be within inches of the animals, stop them, lock them in a head gate and scan them one by one. With the ZigBeef tag, the cattle can run by in large groups and the handler can harvest their ID numbers as they are running by," Hassell maintains.

At an estimated cost of between $7 and $10 each, the price of ZigBeef tags is higher than short-range tags, which retail for around $2.50. But its readers run about $50, compared to the $800 to $4,000-plus price tag for short-range devices, making it much more affordable for small-scale cattle producers. In light of the USDA cattle identification mandate, the question is not whether to tag the animals, but how to do it efficiently and cost-effectively.

ZigBeef is up to the challenge.

"Keeping track of cattle is a big job," says Hassell. "ZigBeef's objectives are to provide a system that enables regulatory compliance, but also gives beef producers new management tools and benefits. With this system, we can do that."

Debra Levy Martinelli is director of public relations and marketing for the OU Office of Technology Development and writes freelance articles for Sooner Magazine.