

# NEW TECH AFFORDS

Virtual fence, drones and blockchain are helping create efficiencies in the beef industry.

by Kindra Gordon, field editor

Virtual fencing, drones and blockchain technology — they may sound like a menagerie of strange, wizard-like tech tools for the distant future. However, truth be told, these technologies are being used here and now. They offer efficiencies to advance the beef industry for better management and profit margins for future generations.

## Virtual-fence reality

Jorgensen Land & Cattle near Ideal, S.D., used virtual fencing during the 2020 and 2021 grazing seasons. As a result, Nick Jorgensen says he's convinced virtual fencing has "real life" applications.

Using technology created by the San Diego-based company Vence, the Jorgensens outfitted replacement heifers with the electronic collars and trained them to respect the virtual fence boundaries emitted by portable base station towers.

When the heifers come close to a preset virtual boundary, the collar makes an audio signal. Heifers quickly learn that when they turn

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around and move away from the area, the audio signal stops. If an animal ignores the signal and continues to move forward, the collar delivers a shock similar to what an animal would feel if it touched an electric fence.

About 90% of animals are

trained from the audio signal, while only about 10% of animals move into the shock zone, Jorgensen reports.

"It's very low-stress, and the shock animals may receive is not as strong as an electric fence."

Once a group of animals is trained to the audio and shock system, the virtual fence boundary can be moved to various locations, and the majority of animals typically respect the invisible boundary, reports Jorgensen. He says 85%-87% of their heifers with collars stayed contained with the virtual fence.

"You still may need a perimeter fence, but within that area, the virtual fence allows you to manage grazing very efficiently," Jorgensen says.

The family used the virtual fence to divide a 70-acre field of

wheat stubble into three paddocks they rotationally grazed using 250 Angus heifers wearing Vence collars.

Jorgensen says he is excited about the opportunity virtual fence offers to integrate livestock onto cropland to achieve extra grazing usage and soil health benefits from livestock urine, manure and hoof action.

Additionally, on 700 acres of grassland they were able to set up virtual fence boundaries around 15 hunting strips to prevent grazing and preserve them for wildlife habitat. Jorgensen notes this particular pasture had not been grazed for 11 years because it is typically saved for habitat and then hunting.

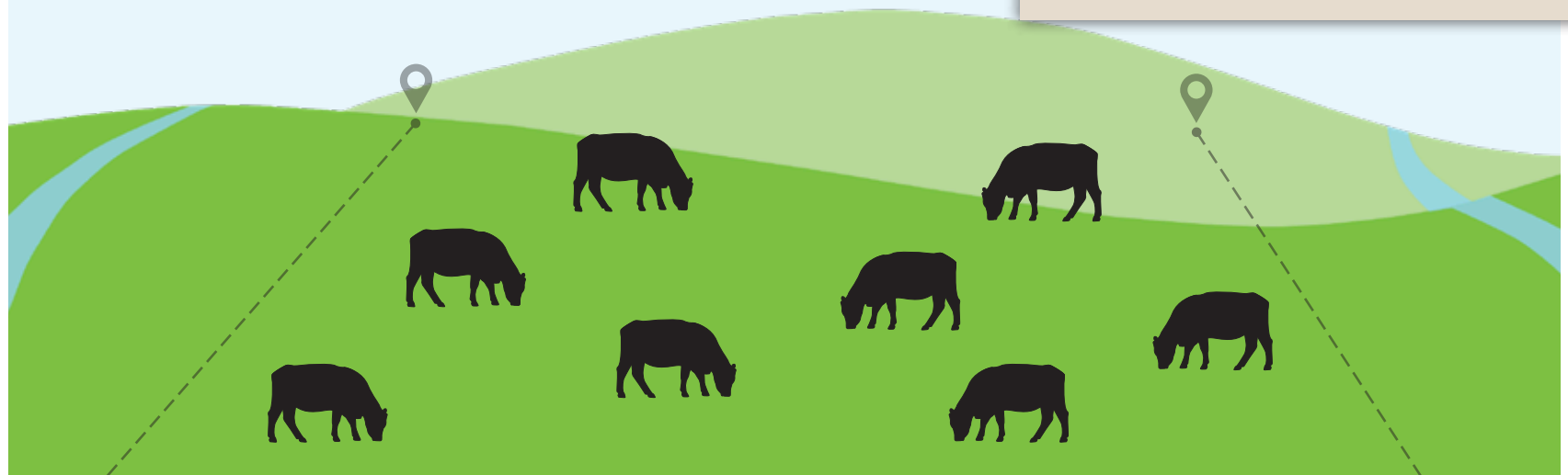
"It would have been a nightmare to fence out hunting strips, but virtual fencing allowed for balancing grazing and hunting goals," he says.



## Digital extra

To learn more about Jorgensen Land & Cattle's experience with virtual fencing, watch Cody Jorgensen's presentation as part of the "Applying Precision Technologies Panel" at the 2021 Beef Improvement Federation Convention and Research Symposium. A summary of the session and a link to the webinar are available in the Newsroom at [www.bifconference.com](http://www.bifconference.com).

Once a group of animals is trained to the audio-shock signal, the virtual fence boundary can be moved to various locations, and the majority of animals typically will respect the invisible boundary, reports Nick Jorgensen.



# NEW OPPORTUNITIES

Jorgensen notes, “We still see the cattle, we just don’t have to move [physical] fences.”

Looking ahead, Jorgensen says, the biggest challenge with virtual fence is the collars. He explains that often the collar wants to flip outward, which prevents the electronic nodes from being able to give the shock cue to animals if they move too close to the preset boundary.

“The technology works. Now it’s just figuring out how to keep the collars on,” Jorgensen states.

The Jorgensens have been working with the manufacturer to develop solutions. One adjustment was using a chain, which is easier to put on, instead of the initial canvas strap.

Jorgensen finds the collars have about a five-month battery life. He placed collars on cattle from May through September and says the battery remained sufficiently charged.

The cost for each Vence collar is a \$35 rental fee per year, plus about \$10 for a battery pack. The base station towers, which have a range of about 6 miles, are \$12,500 each. To date, the Jorgensens have invested in four base stations. They calculate they would need 11 total to cover their entire ranch. Currently, they have made their towers portable to get extra use out of them.

They suggest using the collars on different animals during the year could help with the economics. For example, the collars placed on cows or heifers for grazing May through September could be used on bulls grazing from October through December.

## See more with a drone

Drones, which are also referred to as unmanned aerial vehicles (UAVs), are being used in several industries for tasks like reviewing



PHOTO COURTESY AMERICAN ANGUS ASSOCIATION

Cattlemen are discovering new and creative ways to use drones, or unmanned aerial vehicles (UAVs), such as checking water sources and daily cattle locations. Thermal imaging and other technologies in development could increase on-ranch application.

roof damage; assessing emergency situations; and mapping land areas for mining, roads and other purposes. Opportunities for drone usage are also emerging within agriculture, and western South Dakota rancher Jay Stomprud has begun experimenting with them on his family’s Angus operation.

Learning through trial and error with a used drone he initially purchased on eBay, Stomprud says he sees a lot of potential for drones in farm and ranch work as the technology progresses. He notes that drones save time, which benefits a producer’s quality of life and pocketbook.

Stomprud has used his drone to check water sources for the cattle herd, to monitor the calving pasture, and for daily checks on a set of bulls that he wanted to make sure didn’t get out with the cow herd before they were supposed to.

“I’d fly my drone out each morning and count the bulls,” he explains. What could have taken 30-40 minutes each day took fewer than 10 minutes with the drone, he reports.

Additional applications envisioned for drones include inspecting the herd or fences and monitoring cropland or pastures. Some research is currently using drones with visual sensors to survey land, measure pasture growth and even assess forage quality. Additionally, drones with thermal imaging may allow locating and tracking cows in wooded areas with dense cover, or to track animal temperatures and identify abnormal behavior.

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For others interested in experimenting with drones on their farm or ranch, Stomprud warns there is a learning curve, including figuring out the necessary elevation to avoid running into trees or buttes.

Additionally, finding the appropriate camera angle so the footage is viewable and useful requires a special knack.

“If your camera is pointed directly at the ground, watching that footage could make you ‘car sick,’ ” notes Stomprud.

He usually flies his drone at about 150 feet and at an 18° angle in order to see into the distance. Today, Stomprud has worked with

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several drones and uses Google Maps and an app called Litchi that is user-friendly for programming mapping routes with his DJI drones.

Drone costs vary with size and have different flight distance capabilities based on battery life. About \$500 today will purchase a quality drone. Stomprud says a 20-minute drone flight is about the maximum for the largest drone he owns, and that allows ample flight time for most of his projects.

He notes that drones are regulated by the Federal Aviation Administration (FAA) — just like other aircraft, and there are several rules and regulations to follow. Stomprud has always been careful to fly his drone on their ranch property.

For others interested in drones, even if flying drones as a hobby, the drone must be registered at the FAA DroneZone Portal, and users must take The Recreational UAS Safety Test (TRUST). A commercial license is required for any drones operated for profit. Additionally, current FAA regulations require that drones must be operated within line of sight. Learn more at <https://uavcoach.com/drone-laws-in-united-states-of-america/>.

### Blockchain benefits

Last but not least, blockchain technology offers beef producers opportunities to document value and assets, and then accurately convey traceability to the beef production chain or consumers. As a result, blockchain, which is a way to securely record data and also collect payment, may help producers be paid for their production efforts and environmental services.

Steve Lupien, director of the Center for Blockchain and Digital Initiatives within the College of Business at the University of Wyoming, sees a host of blockchain applications in the beef industry. These include:

- ▶ verifying compliance of ranch



Blockchain is a way to securely record data and also collect payment. It could help the cattle industry capitalize on production information and environmental data, says Steve Lupien, director of the Center for Blockchain and Digital Initiatives, University of Wyoming.

management systems — such as age, source and breed verifications — without the need for paper tracking;

- ▶ supply chain tracking all the way from producer to consumer; and
- ▶ new ways to market and collect payment for everything from beef products to environmental services.

“Blockchain allows doing things we’ve done for a long time in a new and different way,” Lupien summarizes.

As an example, presently blockchain is being used for process-verified program (PVP) documentation in various areas of the food supply chain, including beef. Wyoming-based BeefChain, of which Lupien is a co-founder and current president, was the first blockchain company to receive PVP certification from the USDA in 2019.

The company uses blockchain technology to create a digital trail of tamper-proof and transparent records, documenting enrolled cattle’s history from farm to feedlot to processing facility to end consumer. This provides insights into animal source, production parameters and ownership

through the chain, as well as packaging and shipping data. That information ultimately adds value.

Lupien gives the example of Kona coffee. There is three times more Kona coffee sold than is actually grown, he reports. How can that be?

“We have unscrupulous individuals who mix Kona coffee with cheaper coffee, or some who claim it is the premium Kona brand, when it is not,” he explains. “Blockchain solves that problem because it goes all the way to the start of the supply chain to document the product and reduce counterfeit product.”

Lupien adds, “You can use the same analogy with ranchers. If you have a branded-beef added-value program, this documents and verifies the product to prevent fakes.”

As a forthcoming application, Lupien points to asset tokenization and says, “This is really going to impact the ag industry.”

If there is a tax credit for cheatgrass mitigation or for

providing sagebrush habitat, he explains, a rancher may be able to sell that “environmental asset token” as a carbon offset to an industrial company that needs

carbon credits.

“The federal government is moving toward restrictions on businesses that put out greenhouse gases, and those

businesses will need to purchase offset credits,” Lupien states. “Our industry (ranching) is sitting on unbelievable offsets in that regard.”

He points to clean soil credits, water credits, and the already emerging carbon credits, and says, “We are going to see revenue streams change dramatically.”

Lupien envisions the possibilities around blockchain technology to be “limitless” and encourages producers to stay tuned to the opportunities emerging in the months and years ahead. |

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Editor’s note: Kindra Gordon is a freelance writer and cattlegirl from Whitewood, S.D.