

Virtual Fencing's Realities

Crossfence pastures, create exclusion zones and track utilization patterns, all from your computer screen, with virtual fencing.

by Paige Nelson, field editor

Imagine never using fencing stretchers again!

Keep imagining, because we're not there yet.

However, in the global technology age, we're needing those stretchers less often. Virtual fence has long been dreamed about by cattlemen and conservationists alike. Early adopters of the technology are continuing to find ways to exploit its capabilities. We are learning more about its pros and cons with each cow fitted with a collar. Here's where we are today.

What is virtual fencing?

Although virtual fencing may still be described as in its infancy, there are several versions on the market. The two most prominent U.S.-based companies are the Vence® tool from Merck Animal Health, and Corral Technologies.

Both companies provide the cattle producer with software that allows them to draw virtual fence boundaries on their ranch. Intensive-grazing quadrants, riparian-area exclusions, underutilized areas, water sources, pivot towers, etc., can be fenced with a few clicks.

Being picky about where the cattle graze and how long they stay there creates opportunities to improve soil health and grassland management, which in turn leads to more sustainable cattle production, says Gary Tiller, commercial director for the Vence tool.

Each cow or stocker animal (bulls and calves not included) is fitted with a collar capable of audio and electric stimulus. The collar uses these stimuli to cue the animal away from the virtual fence boundary. The collar connects to a cellular network and communicates with a satellite to know

where the virtual boundary lies, and also relies on the satellite to relay that collar's data to the rancher's phone or computer app.

Virtual fencing is not, however, a replacement for permanent perimeter fence. No. 1, it's not a legal perimeter fence. No. 2, cattle will invariably "get out" no matter what type of fence they are in.

Differences between the companies exist in the case of how the collars connect to the cellular network, collar design, price of the service and the required infrastructure. Which company will serve you best, really comes down to what your goals are and where in the country you are located.

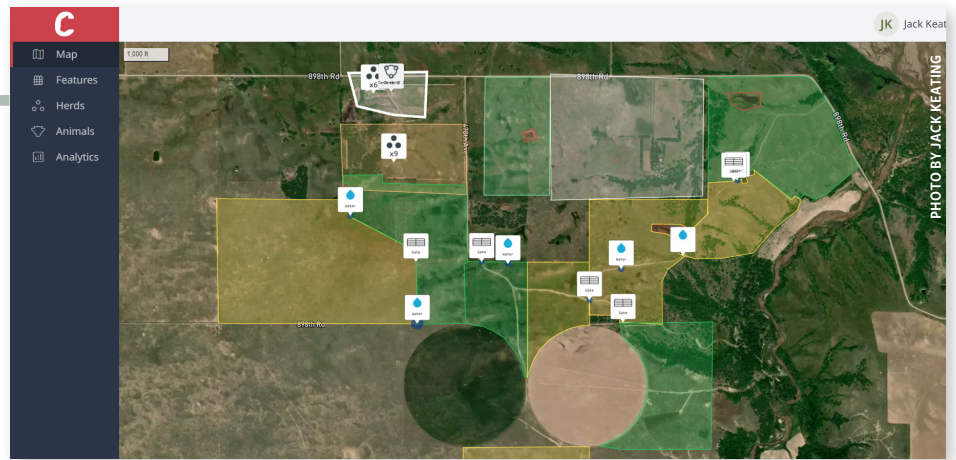
Corral Technologies

PLATFORM: According to Jack Keating, founder and owner of Corral Technologies, his system works as follows: "You pull up a



PHOTO BY GARY TILLER

“Those cattle are guided along those routes via the stimulation, and that stimulation is also directional, so we can actually move them one direction or the other.”
Jack Keating



An example of the Corral Technologies software overlay mapping tool.

satellite image of your operation on Corral’s software, in which you can draw pastures and exclusion zones, and then we utilize those coordinate points on the collars to keep those cows contained within a pasture.”

The GPS coordinates are stored on the collar. Each collar device has a GPS module on it, which communicates to a satellite to get its location and to communicate to the collar where the virtual boundary is. The pasture doesn’t necessarily have to be located in good cell service. But, the animal needs to connect to cell service at least once a day to update its location and receive any new messages about virtual boundaries.

If a pasture is lacking cell reception, Keating suggests putting salt or mineral tubs in a place that does have a good connection, such as on a hilltop.

“So, as long as they connect once a day and get those messages down and send their data up, then you’re OK,” says Keating.

COLLARS: Corral Technologies collars use solar-charged batteries with the control box and solar panel resting on top of the cow’s neck. One or two days of good sunshine will provide 12-14 days of battery life. The typical lifetime for the battery is around two years. As the cow approaches the boundary, she is given a sound, then more sound and eventually an electric pulse

Left: Cattle can be trained to a virtual fencing system in as little as a few days to up to 14 days, depending on the size of the training paddock and the design of the boundary fence.

to deter her from continuing to approach or cross the boundary, says Keating.

Corral prides itself on its collars’ ability to provide stimulus on both sides of the neck, which means the cow’s movement can be directed. Not only can she be kept within a virtual pasture, but she can be moved to a new pasture via collar stimulation.

“Using the software, you’ll draw out all of your pastures on your operation, and then draw routes from one pasture to the next. Those cattle are guided along those routes via the stimulation, and that stimulation is also directional, so we can actually move them one direction or the other,” Keating explains. “This allows us to have a higher reliability in terms of moving cows, but also containment at the same time.”

Each collar is adjustable — an important aspect when it comes to the animal quickly responding to the stimulus.

PRICE: Corral Technologies charges \$250 per collar plus a \$50 subscription fee per year. The collar has a lifetime warranty, so if anything happens to the collar, even if it is after the two-year life expectancy, Corral Technologies will replace it for the rancher. First-year initial fee: \$300 per animal. Subsequent years fee: \$50.

LIMITATIONS: Most of the research and development testing for the Corral Technologies system has been done in Nebraska. Keating is expanding to the east and the west to hopefully get more data back on how his system works in different

environments and topographies. For now, there are still some unknowns when it comes to how the fence will work outside of the Midwest.

“I don’t have a whole lot of concerns with the containment side of it (in rugged areas). Obviously, you have to work with the terrain when you’re drawing out these pastures,” says Keating. “The big issue we have with any of those conditions is connectivity, and we’re going to keep facing that.”

Keating is currently investigating different communication technologies to address the connectivity issues. He hopes by 2025 to have eliminated most, if not all, connectivity problems.

Vence

PLATFORM: “The Vence tool is really about simply classical-conditioning cattle to respect a boundary based on tone, not really on the pulse itself; and allows ranchers to manage their cattle and grass inventory at a high level of precision,” explains Tiller.

“Each individual collar comes with its own GPS unit, and through our herd manager software, you can create fences around your ranch any way you want,” he continues. “Then that information gets uploaded to the cloud and downloaded back to the collar, so each collar operates independently. Every cow has a collar. Every collar has the instructions for where that virtual fence is.”

Continued on page 76

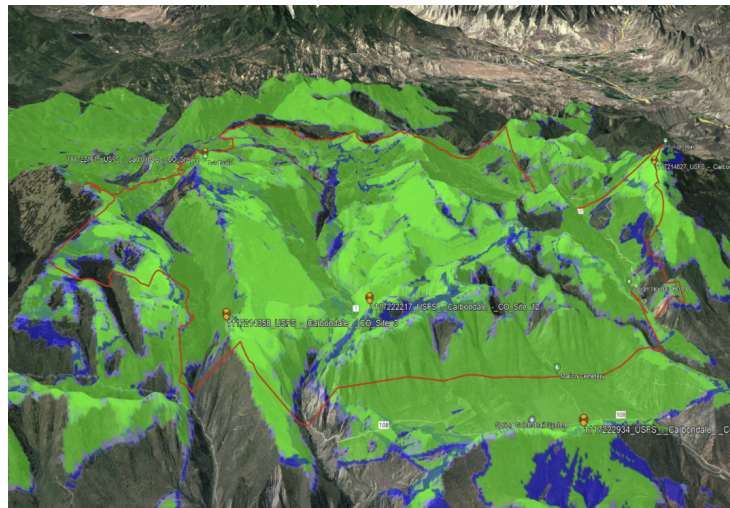


PHOTO BY GARY TILLER

This Colorado ranch is using the Vence tool to fence 70,000 acres of mountainous area. Five towers (yellow dots) are placed strategically to offer the most radio frequency coverage. Green coloring represents radio frequency coverage. Blue areas are shadows without coverage. Red lines represent perimeter fencing.

Vence has primarily been developed and used in what Tiller calls “big ranch country,” or the West. In order to ensure the entire ranch can be virtually fenced, even in areas with zero cellular connectivity, Vence uses base stations to grab a cell signal and then spread that communications network out to each collar.

The collar communicates with the base station, and the station uploads information to the cloud and downloads information from the cloud to the collar, like new virtual boundaries. Users of the herd manager software receive updates from the collar every 30 minutes, including information like collar GPS location, if the collar hasn’t moved for 12 or more hours, etc.

Tiller explains, “The base station is a machined aluminum hut that utilizes a deep cycle battery and a solar panel to power the electronics and a cellular LoRaWAN® (long-range wide area network) antenna to transmit and receive signals.”

COLLARS: The Vence tool has been deployed in ranches across the United States and Australia, and is committed to constant improvements of the collar.

“We’re constantly making improvements in the functioning aspects of the collar,” says

Tiller. “Today, I would say that collar is very durable. Now is it durable enough for bulls and bison? No, not yet. It’s definitely durable enough for cows and yearlings.”

The battery in each Vence collar is a high-density, one-time use, lithium-ion battery. It is designed to last one grazing season and be able to withstand extreme heat, humidity and cold. Batteries will need to be replaced on each collar at least once per year, but possibly more frequently depending on how often they are giving audio and electric stimuli to the cattle.

“Our use of the stainless-steel chains to connect collars to cattle results from years of field work on cattle. Because cattle rub and scratch, we found they were twisting the collar away from the skin, which resulted in no contact with the positive and negative probes. With the stainless-steel chains, we are able to ensure constant contact and reliable stimulus.

“We are often asked about the pulse itself,” he continues. “The electric stimulus from our unit is roughly five to six times lower than the charge from a traditional electric fence.”

PRICE: Vence’s base stations cost roughly \$10,000. Collars, including the battery, are leased for a full grazing season at \$50. That \$50 collar lease includes the subscription to the software and includes technical service. Additional batteries cost \$10.

LIMITATIONS: “Just like everybody out there, this whole system is at the mercy of sun flares or whatever else that cause disruptions in the global telecommunications network,” laughs Tiller.

Occasional upgrades to the communications network may cause cell coverage to be down for some time, but Tiller assures that his team is usually ahead of those situations and alerts the rancher to what is happening.

A rancher’s perspective

Leo Barthelmess, a cattle rancher in south

“It’s pretty arid ground, and it’s a way we could subdivide the pastures to improve forage harvest, soil health and livestock health, and still not create more conflicts with the wildlife.”

Leo Barthelmess

Phillips County, Mont., began using the Vence tool in coordination with the Ranchers' Stewardship Alliance.

"There's a large wildlife migration going through the property," he explains. "It's pretty arid ground, and it's a way we could subdivide the pastures to improve forage harvest, soil health and livestock health, and still not create more conflicts with the wildlife."

He has had virtual fencing on his ranch since 2019, and offers some working perspective on the technology.

"I keep telling myself it's an emerging technology, and I had pretty high expectations," he says. "For the most part, they've been met. But, you know, it's electronics and stuff. It goes sideways, but I'm still happy with its potential, and happy with the outcome we're getting."

When it comes to the ranch's bottom line, Barthelmess thinks the cost of virtual fencing is somewhere between building a permanent barbed-wire fence and a two-wire electric fence.



PHOTO BY LEO BARTHELMESS

A Vence base station.

It's all expensive, he says, but we need to protect our soils for the next generations.

Barthelmess offers the following advice for someone considering virtual fencing:

- ▶ It's illegal to use it as a boundary fence,

and it's not designed to be one.

- ▶ Do not use virtual fencing to separate cows from a high-value crop like alfalfa, wheat, corn, etc. "To depend on keeping a bunch of cows out of somebody's high-value crop — that's a bad idea," he warns.
- ▶ Know what your goals are for a virtual fencing system. "If you've never done intensive grazing on your ranch, it could work well for you. If you have been using intensive grazing and your ground has already improved substantially, it may not make enough difference to justify itself."

We can't ditch the fencing pliers or stretchers just yet. Barbed wire has been around since the 1800s. It's still irreplaceable on the ranch. However, virtual fencing is proving itself to be another tool in the stewardship and animal husbandry toolbox. **ABB**

Editor's note: Paige Nelson is a freelance writer and cattlewoman from Rigby, Idaho.