



The cattle net

In Brazil Bosch is connecting beef herds with the web

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- ▶ Precision livestock farming increases ranches' productivity
- ▶ Sensor system records animal's weight and relays it to the rancher
- ▶ Lower environmental impact, greater customer benefit

Brasilia: Red dust blows across the broad and sweltering steppe, and there's a strong smell in the air. Forty thousand head of cattle can't help but give off a certain odor. These ones have no idea that they're pioneering the future of livestock farming. Thankfully for those sensitive to smell, Fazenda Santa Fé, one of Brazil's largest cattle farms, is situated far off in the Brazilian state of Goiás, some 400 kilometers southwest of the capital, Brasília. Despite its remote location, this farm could be key to shaping the future of agriculture — even far beyond Brazil. That's because the Bosch Precision Livestock Farming system is being used here for the first time. Gustavo Ferro, wearing a light-colored shirt, jeans, and ostrich leather cowboy boots, explains what this entails. "It takes a lot of time to weigh that many cattle. However, it's decisive to the economic success of a farm to frequently check the animals' weight, and to be as precise as possible in doing so. And we now offer a solution that does precisely that." Ferro has been working on the project since spring of 2014 – it now involves around 20 associates, including veterinarians, agronomists, and, of course, engineers from a variety of areas.

Each animal is recorded individually

Animals come to the fazenda ("plantation") to be fattened up about three months before they're ready for slaughter. "Depending on the breed, cattle should gain up to two kilos a day," says Ferro. "Up until now, we could only estimate if they actually did." Weighing all the cattle here posed a considerable challenge, even for experienced farmers. Moreover, adds Ferro, false estimates cost money. "If the breeder sends a bull to slaughter too early, they miss out on the profit that additional weight gain could have brought. If they send it in too late, they've spent

unnecessary money on feed and care.” That’s all coming to an end at Fazenda Santa Fé – at least, in the plots that have already been fitted with the Bosch system. The water trough is placed in one corner of these plots, and the feed is placed in another. A fence separates the two. There’s only one path between them, and a scale is installed there. Each time a bull walks over it, it’s weighed. A reader over the scale detects each bull individually; an RFID transponder is placed in each one’s ear. Sensor signals are processed and linked in a gray box on the scale. The energy to power this comes from an integrated solar panel, and the signals are transmitted to the farm management via antenna, without requiring the internet.

Off beyond the fences, the cowboys are making their rounds. They’re wearing hats, spurs, and leather chaps, just like their forebears did a century ago. The only real difference is that today walkie-talkies hang from their belts instead of revolvers. Around midday, they all gather to eat at the farmhouse. Those who don’t have horses are picked up by the farm bus. The sky is endless, and the horizon shimmers way off in the distance. Today, Frederico Rosseto only has time for a small snack. This agronomist, who’s responsible for rearing cattle in Santa Fé, is sitting in front of a screen inside a spare, highly air-conditioned office. Software developed by Bosch now provides Rosseto with an overview of his herd unlike any he’s had before. “I can track each animal’s weight gain and calculate average values for specific plots. I can see if the animals are healthy or losing weight, and above all, I can link the data with the current market price and decide much more quickly when the time is right for slaughter.” Rosseto estimates that each bull with a Bosch chip in its ear will yield 45 more reals (currently just under €13) in profit than one of their non-networked peers. With more than 100,000 head of cattle running through the fazenda every year, that adds up to a hefty sum.

Precision livestock farming system increases ranches’ productivity

Gustavo Ferro, who is descended from a family of Brazilian farmers himself and whose grandfather herded bulls through his village with a cane, is already setting his sights far beyond Santa Fé. “In Brazil alone there are almost 200 million bulls, there are around 50 million in Argentina, and in the United States. There are twice as many as that. The market is massive.” Ferro isn’t just thinking about business; he’s also considering the discourse regarding the environmental consequences of rearing cattle. “The Precision Livestock Farming system will boost farm productivity. That means individual bulls will probably require less feed and land.” The heavy bulls at Santa Fé, some of which are swaybacked, have now trampled over the Bosch scale 3.3 million times. “The reliability is incredible,” says agricultural expert Rosseto. “The system also works perfectly when it’s raining or when the mud is ankle-deep.” He and his colleagues spent months fine-tuning hardware, changing components, and exchanging materials.

They did some of this at the Bosch regional quarters in Campinas, and some out in the field, “always in close cooperation with future users,” says Ferro. The unsuspecting bulls at Santa Fé embody the Bosch 3S strategy: sensors, software, and services, all networked together. Incidentally, the idea to do something with cattle came directly from Regional President Besalio Botelho. “Without the ongoing support of higher-ups, we wouldn’t have been able to accomplish this here so quickly,” says Ferro. Additional success factors include “an agile approach, design thinking, and a willingness to get our hands dirty.” The team now views the data pouring in, which may also influence the next generation of algorithms. “We expect that we’ll continually improve our understanding of how the individual factors in cattle fattening relate to one another, from the weather, to the feed composition, to the number of animals per plot, and so on and so forth,” says Ferro. “This will continually increase the benefits for our customers. And the strain on the environment will also be reduced as efficiency increases.”

It’s still rather unusual for Bosch customers to wear a cowboy shirt instead of a bespoke suit, and for their workplace to smell like cattle instead of diesel – but more and more projects in the company are being carried out to equip the world’s oldest industry with cutting-edge technology. From cultivating olives in Andalusia to harvesting oysters in Australia to growing asparagus in Germany, Bosch is incorporating agriculture into the Internet of Things.

Ferro, a farmer’s son and an industrial engineer who worked for many years in entirely different areas in Germany, is excited about the new business fields – as well as his return to his own roots. “I never thought that I’d work with cattle at Bosch, or that we’d develop a solution that could shape the industry, no less. That’s a huge motivation for me.” And he’s doesn’t mind having to clean off his boots in the evenings after work, either.

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with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is “Invented for life.” The Bosch Group comprises Robert Bosch GmbH and its roughly 450 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch’s global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company’s future growth is its innovative strength. At 125 locations across the globe, Bosch employs 62,500 associates in research and development.

The company was set up in Stuttgart in 1886 by Robert Bosch (1861-1942) as “Workshop for Precision Mechanics and Electrical Engineering.” The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant up-front investments in the safeguarding of its future. Ninety-two percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The majority of voting rights are held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust. The remaining shares are held by the Bosch family and by Robert Bosch GmbH.

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