Actility

Success Story
- Smart Agriculture -

DIGITA OY

Connected reindeer pave the way for improved herders' lives

A race against natural elements to find missing animals

Reindeer herding is a three-century-old Finnish tradition that still thrives in Lapland. "Reindeer herding to produce meat, furs, and antlers is one of the most traditional ways of living for us in Lapland", explains Matti Särkelä. "But it is also crucial for the economy since tourism is booming in the region." Reindeer are big business in the region, with up to 300,000 animals herded each year, generating around €25m.

Matti has been the Reindeer Herders' representative in Rovaniemi since 1999. He is responsible for "developing technologies and all kinds of initiatives that help reindeer herders". Their activity is a way of life, not just a job since semi-wild animals roam freely most of the year. Growing up in herders' family, Matti knows it as well as any herder.

Jarno Konttaniemi is a member of the Palojärvi cooperative near Rovaniemi. He has made a living as a herder for 15 years, sometimes walking up to 40 km a day to protect his animals from predators – bears, wolves, eagles, wolverines and lynxes, and from road and railroad traffic. Still, up to 10% of

herds go missing each year, of which only 1/2 can be found.

This is a problem, because the Finnish government offers financial compensation to herders like Jarno if he can produce evidence that the animal has been killed. Here comes the tricky part: what is the right technology to
> track and locate roaming animals across 120,000 km^2
> implement in a rural area with limited GSM coverage and GPS accuracy
> offer cheap and comfortable sensors able to withstand harsh winter conditions.

"The previous GSM-based solutions required energy-hungry trackers, their batteries making them both large and heavy thus uncomfortable for the animals. Even then, the devices could send only one location per day. Which is a problem because during winter, herders only have a few hours to find a missing reindeer until its track on the ground gets covered by snow."

Ari Kuukka, Director, Head IoT Services, Digita Oy

The most challenging use case in Finland

The pilot study began in June 2017 with a few tens of trackers being installed on selected animals at the bi-annual round-up in October.

The trackers use GPS satellite signals to determine their location, but communicate that location to Digita's gateways over low power LoRaWAN. This maximizes the battery life and reduces costs since there's no need for cellular subscriptions for every device.

During the first phase of this pilot, lasting until next summer, Ari and his team are assessing what network technologies they need for this use case. They are also testing partner devices that can withstand harsh winter conditions. "Once we have successfully evaluated the technology, we will most likely extend the pilot to larger volumes, customizing the solution to be even more comfortable, compact and light for the animals to wear", says Ari Kuukka.

> **If we manage to track reindeers in Lapland, it means that we can track virtually anything!**
> *Mika Flinck,*
> *IoT services Sales Director at Digita*

Reindeer Herders' Association

DIGITA

In terms of technology, Ari is also convinced that the next step is to combine LoRaWAN and GPS into a solution tailored to the herders' needs. Reindeer tracking in Lapland is one of the most challenging LoRaWAN use cases imaginable:

> **This IoT application is about using technology to help keep our traditions going in years to come.**
> *Wim Van Gierdegom, General Manager*

The power of LoRaWAN combined with GPS

Matti and his peers are never short of ideas when it comes to innovation with technology! The Association's journey started over ten years ago, using GPS and GSM solutions. It continued three years ago with a smartphone app called "Porokello" (reindeer bell in Finnish) warning drivers of the presence of reindeer near the road.

In 2017, the herders contacted Digita Oy, the main national broadcast services provider, to help them equip animals with cheaper, smaller and lighter trackers, that also have year-long-lasting batteries to cover the time between two round-ups. Challenge accepted by Digita!

As a matter of fact, at the end of 2016, the operator Digita started rolling out its nationwide LoRaWAN network using Actility's ThingPark platform. Gateways were mounted on the company's existing television 300 meter-high masts to achieve very long-range coverage.

> **Digita is building a LoRaWAN network to provide services for several business sectors in Finland ranging from housing to logistics or air quality monitoring. There is big demand for this kind of low-power, wide-area technology.**
> *Ari Kuukka, Digita Oy*