SALTO

Ultra-high-frequency RFID reader for real-time sheep location and activity monitoring in sheepfold environments

PATENTS 2 PATENTS

What it is

SALTO is an ultra-high-frequency radiofrequency identification (UHF-RFID) reader system developed by CEA-Leti for the 2D location of sheep in sheepfold environments. It is built on an innovative compact ESPAR (electronically-steerable parasitic array radiator) leveraging superdirectivity and signal processing algorithms developed specifically for the location system. The technology is the result of five years of R&D at CEA-Leti financed in part by the Carnot Network and the Auvergne Rhone Alpes region.

What it can do

This low-cost location technology using UHF-RFID enables accurate monitoring to help sheep farms achieve greater productivity and reduce livestock mortality through:

- Individual health monitoring
- Better monitoring of lambing to increase productivity,
- Lower lamb mortality during fattening
- Early detection of signs of disease to limit the use of antibiotics

Ultimately, this type of system could also be used for IoT, logistics, surveillance, home automation, and other location applications.

What makes it unique

Superdirectivity is used to focus the compact ESPAR's radiation pattern in the direction of interest. The antenna beam is electronically steered in eight directions on a horizontal plane by optimized RF circuits. Algorithms based on both measurement of the RFID signal phase and amplitude are used to calculate the position (distance, angle) from the ESPAR to individually locate tagged animals. Lambs can be located at distances of five to six meters with a position angle accurate to within one degree.

▲ *Schematic view of the RFID reader system for sheep location*
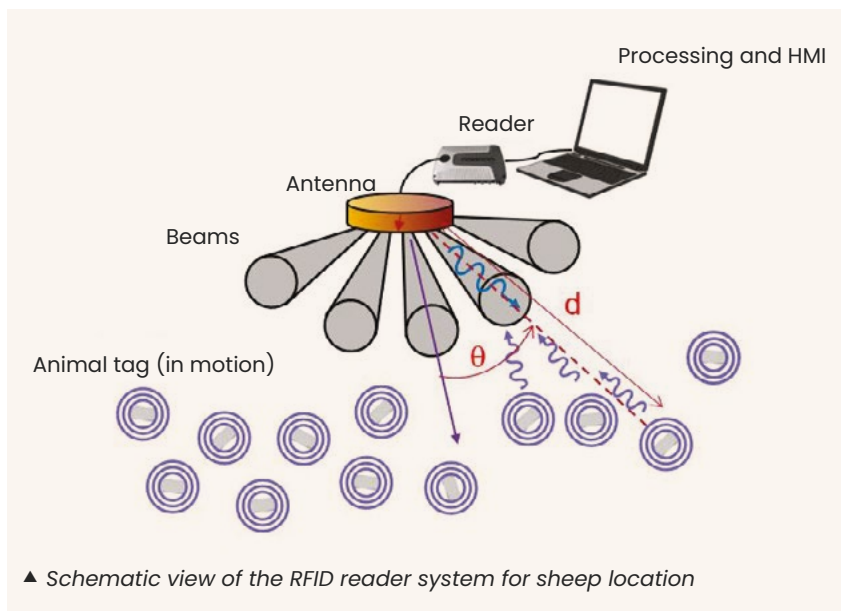
At a glance

- TRL: 6
- Range: up to 10 meters
- 360° monitoring in antenna horizontal plane
- Angle of arrival with 1° accuracy

▲ *Super directive ESPAR antenna prototype*
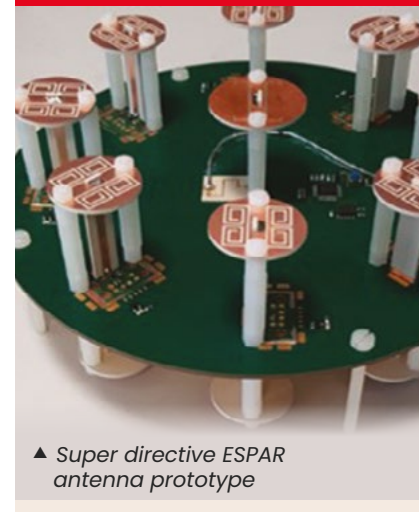
What's next

The technology is currently being improved further with a partner company for a potential logistics application. Optimized ESPAR antenna gains should result in longer read ranges; a circular polarization radiation pattern should eliminate the misalignment effects of linearly polarized RFID tags. Finally, latency will be reduced to enhance the system's real-time capabilities.

Interested in this technology?

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