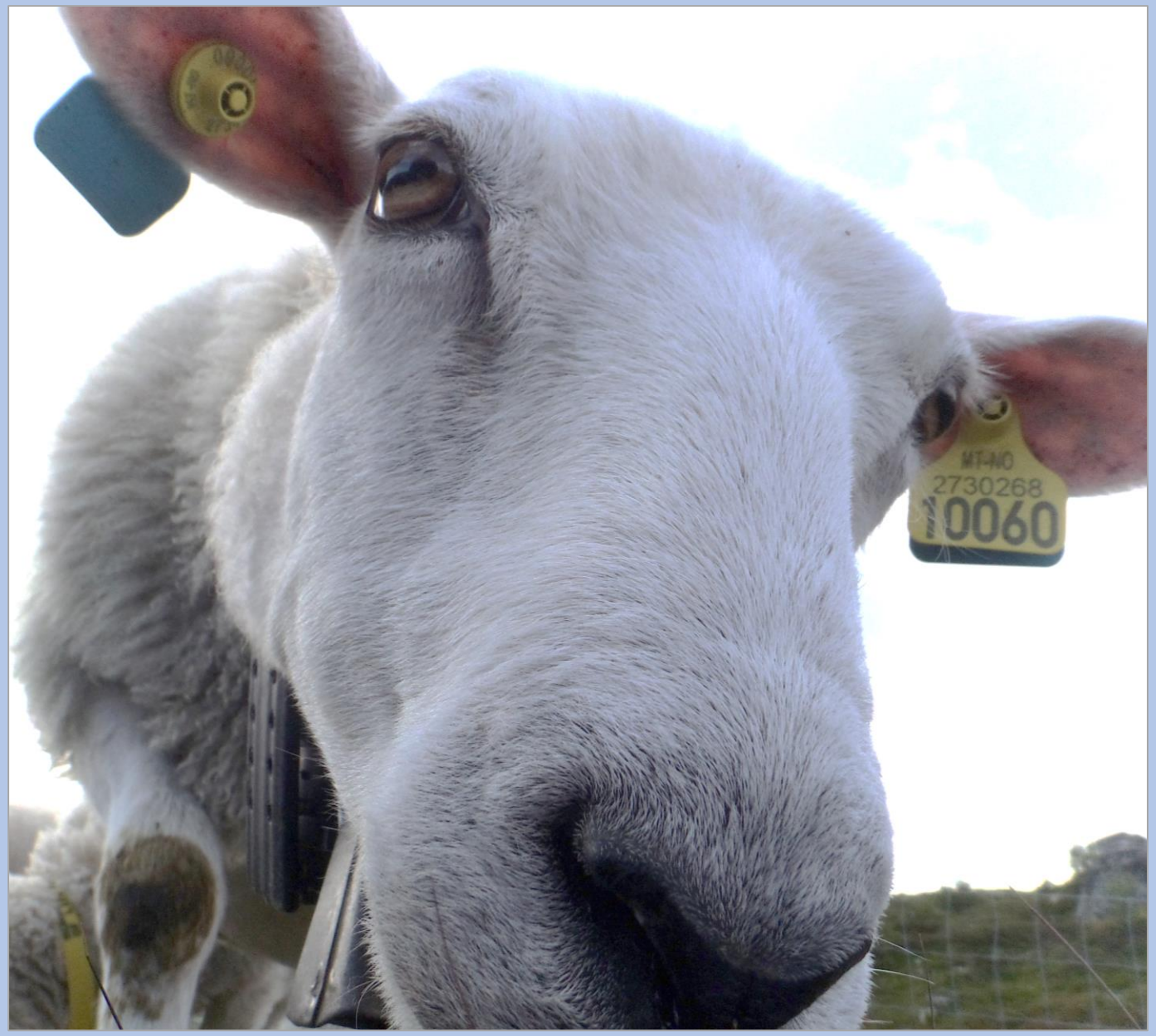
UHF electronic identification may improve efficiency and animal welfare in sheep production

Geir Steinheim et al.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Outline

- Background - UHF radio frequency identification for sheep
- The “ROSEI” project – **Ro**bust **S**heep **E**lectronic **I**dentification
  - Work, results and lessons learned
- What’s next?

RFID – Radio Frequency Identification:

- wireless use of electromagnetic fields to transfer data - automatically identify tags/chips

LF - Low Frequency (wave length ≈ 2.2 km)

UHF - Ultra High Frequency (… ≈ 35 cm)

LF is the approved EU standard for livestock

UHF – faster reading, longer range, absorbed by water-rich bodies

LF – stable, shorter range, less affected by water-rich bodies

Tag & reader

- Tag contains an rfid chip with a small antenna
- A reader generates an electromagnetic field that induces / capacitates power in the (passive) tag which then send its stored information to the reader

ROSEI – SMEs and R&D partners, with contacts

- Agrident Helmut Ruppert
- TLR Les O'Leary
- Roxan Brian Eadie
- PageUp Florian Gimbert

- ISRI/PERA Brian Stevens
- NMBU Geir Steinheim & Øystein Holand

- Farmer / end-user Michael McHugh

The ROSEI project

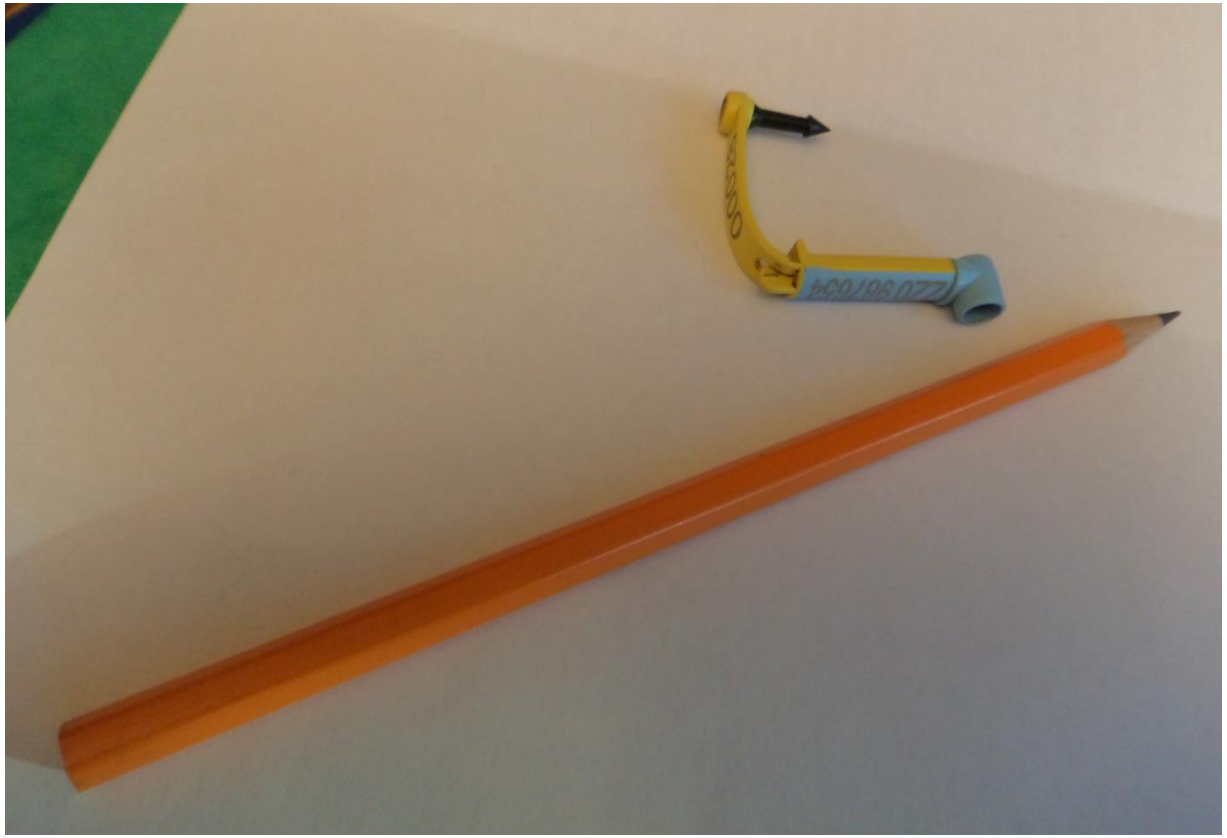
Objectives:

- 7th FP project, 2013-2015
- Goal: develop a UHF-based a reliable and robust EID solution for tracking sheep movements in flock conditions
- UHF tags, readers, mobile applications, cloud based database, anti-collision solutions

Off-the-shelf antennas and readers

UHF tag

- Small & light: ceramic materials
  - The chip was fitted inside a 24 x 4.5 x 5.5 mm tag body



Setup, race tests

100 sheep, 1.6 m wide runway, 2 stationary antennas

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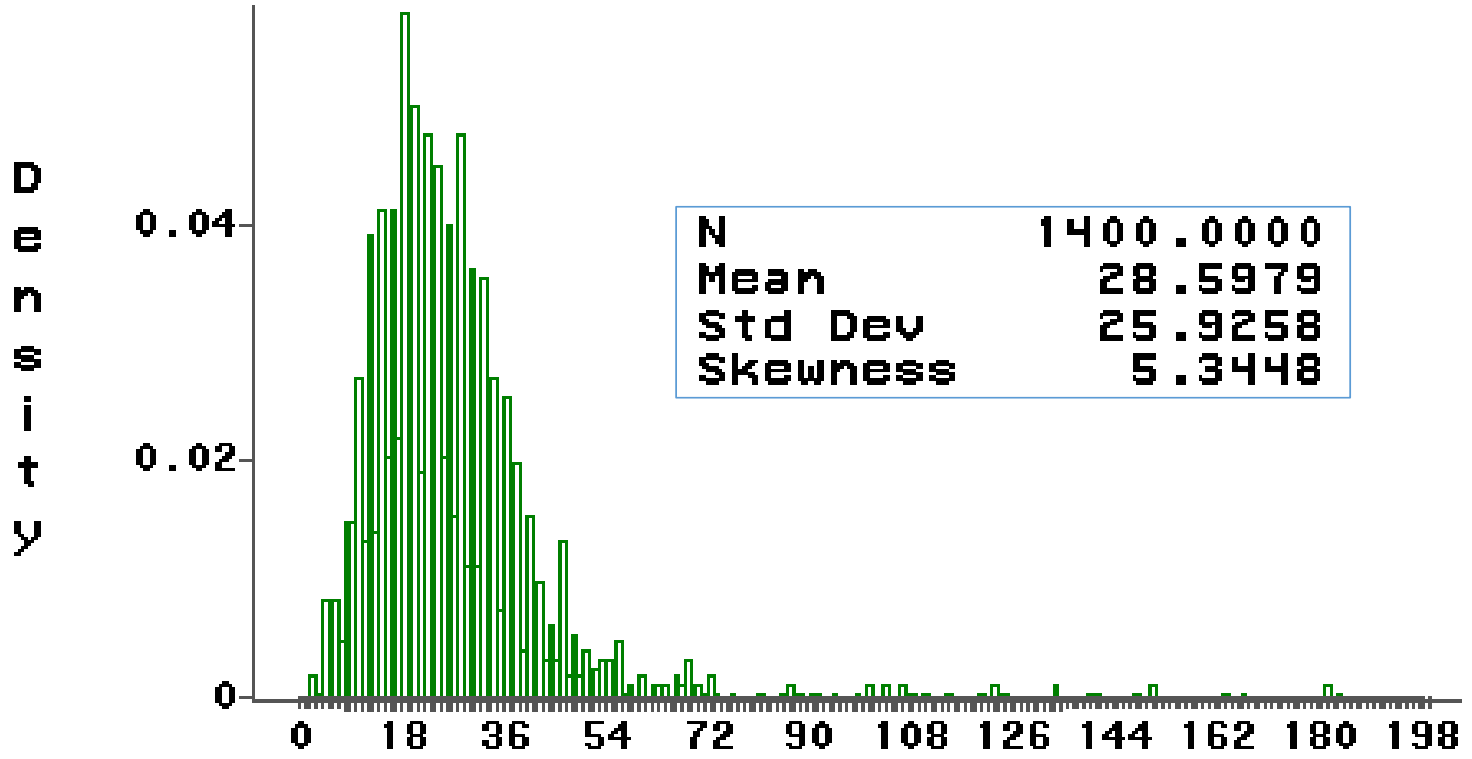
Results

- Flock of 100 sheep, 1.6 m wide race made of metal, 2 antennas
- The flock sent through 28 times
- All 2800 tag*runs were read

- Wooden race 1.4 m wide, 2 antennas, 20 tagged sheep
- Through race 20 times
- 419 out of 420 tag*runs were read

Tags read several times each run (20 – 50 times/sec)



Number of times a tag was read per run

What affects number of times a tag is read?

- How fast the sheep moves past the antennas, explains 80% of variation

- Other individual and flock behaviours?
  - Head up/down
  - How tight the flock is packed together
  - Body size relative to other individuals …?

→ likely to affect reading

UHF vs LF

- UHF good for recording IDs of all sheep in a group: flexible & relatively inexpensive reader/antenna setup (but: price of the *tag* still high…)
- LF good for recording ID of specific animals, e.g. when weighing (but output of UHF readers may be adjusted until suitable read range)
- UHF – most relevant for abattoirs, transporter and large sheep farms?
- Most realistic to use UHF tags in *addition* to the EU approved LF tags?

Extensive pasture husbandry: monitoring presence of animals using UHF tags and reader at salt-licks or by tracks?

Include monitoring ewe-lamb associations?

Thank you!