

A SYSTEMS DESIGN FOR SENSOR-BASED PARTURITION AND CALF STATUS DETECTION IN RANGELAND ENVIRONMENTS

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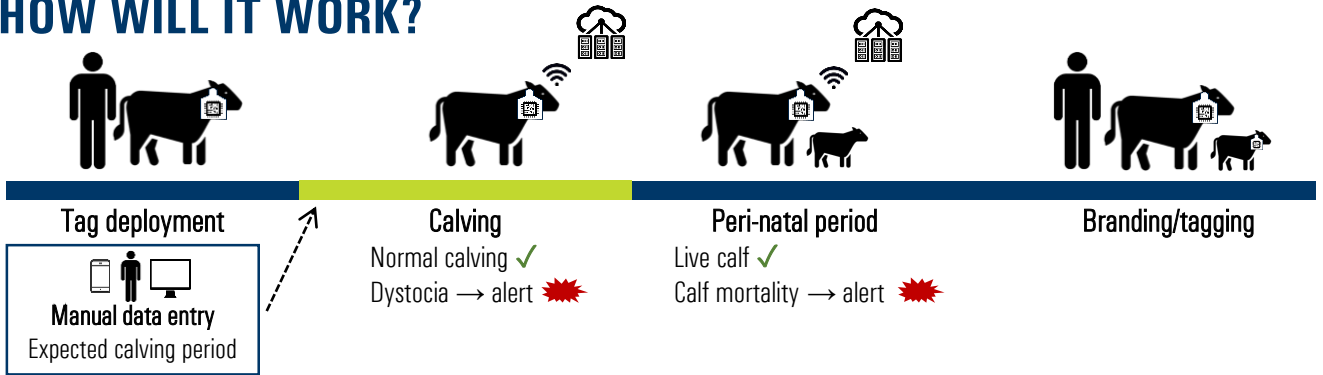


OBJECTIVE

Explore how an on-animal sensor system could be used to detect calving and calf status and methods in which this information could be delivered to producers.



HOW WILL IT WORK?

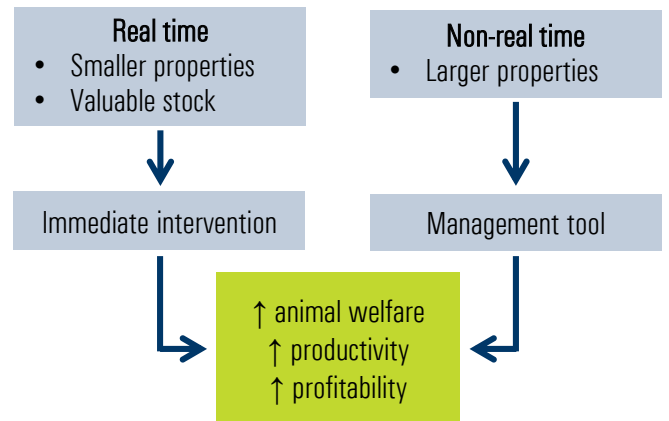


WHAT INFORMATION DO WE NEED?

| CALVING | Normal calving | |
|---------|---|--|
| | Beh | <ul style="list-style-type: none"> ↓ rumination (Kovács et al., 2017) ⚡ ↑ lying bouts (Barrier et al., 2012) ⚡ ↑ distance to peers (Rørvang et al., 2018) 📍 |
| | Phys | <ul style="list-style-type: none"> ↓ progesterone (Streyll et al., 2011) 🧪 ↑ heart rate (Kovács et al., 2016) ❤️ |
| | Dystocia | |
| Beh | <ul style="list-style-type: none"> ↑ contractions (Barrier et al., 2012) ⚡ ↑ head turning (Kovács et al., 2016) ⚡ | |
| Phys | <ul style="list-style-type: none"> ↑ β-endorphin (Aurich et al., 1990) 🧪 ↑ heart rate (Kovács et al., 2016) ❤️ | |

| CALF STATUS | Live calf | |
|-------------|---|--|
| | Beh | <ul style="list-style-type: none"> ↓ feeding (moose) (Wolff & van Horn, 2003) ⚡ ↑ vigilance (elk) (Childress & Lung, 2003) ⚡ |
| | Phys | Unknown |
| | Deceased calf | |
| Beh | <ul style="list-style-type: none"> Initial ↓ feeding (cattle) (DeMars et al., 2013) ⚡ ↑ vigilance (cattle) (DeMars et al., 2013) ⚡ Extensive wandering (deer) (Ozoga et al., 1982) 📍 | |
| Phys | Unknown | |

HOW DO WE WANT THE INFORMATION?



CONCLUSIONS

- On-animal sensing systems have potential to detect calving and determine calf status in rangeland systems
- Further research is required to explore the behavioural and physiological changes associated with live and deceased calves
- Different production systems may require different alert levels

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- ⚡ Motion sensors e.g. accelerometers
- 📍 Location sensors e.g. GPS
- ❤️ Physiological sensors e.g. heart rate monitors
- 🧪 Biosensors