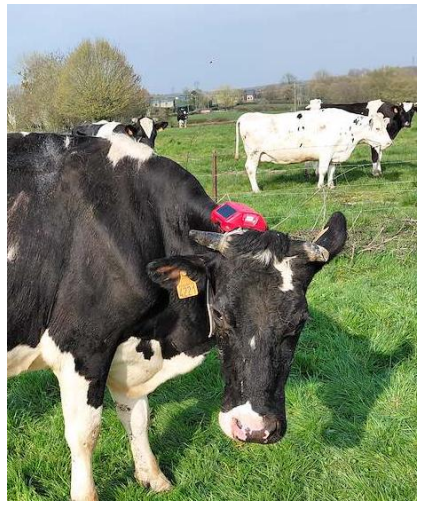
Grazing traceability of dairy cows with GPS and accelerometer sensors

From declared grazing to measured effective grazing



Allain C., Delpeuch A., Okoye K., Legris M.
Vimont M.

Why grazing traceability matters ?



- Grazing is central in many French dairy systems
- PDO cheeses and organic schemes require objective proof of grazing

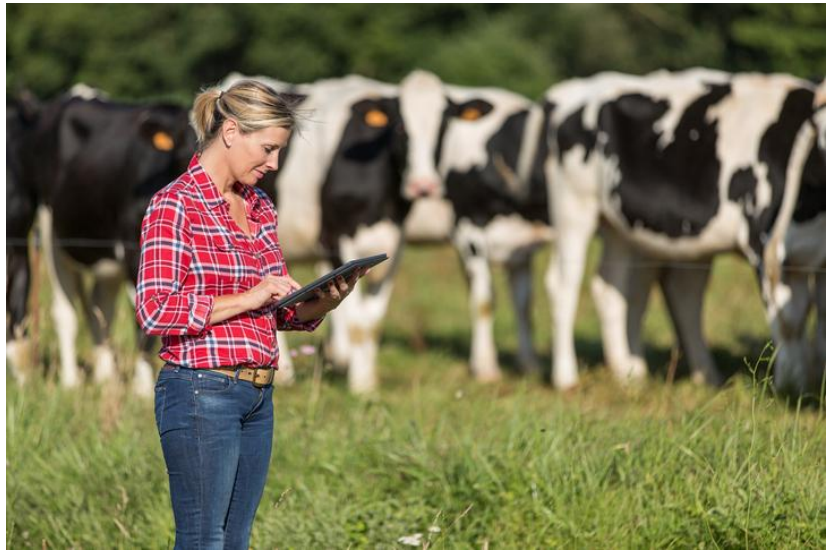
Example: Maroilles PDO area

≥170 grazing days/year,
≥6 h/day,
≥30 ares/cow/year

"We do not only need to know if cows have access to pasture; we need to know when, where and how long they really graze."

Current traceability gap

- **Current controls** rely mainly on declarations, paper records and audits **once a year**.
- **Being outside doesn't mean grazing !**
- **Existing GPS tools :** low frequency, data gaps and limited spatial accuracy make interpretation difficult

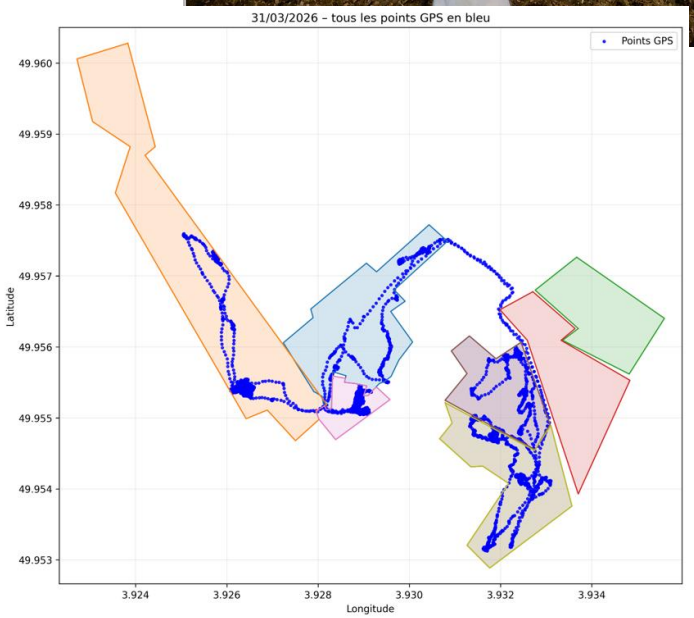






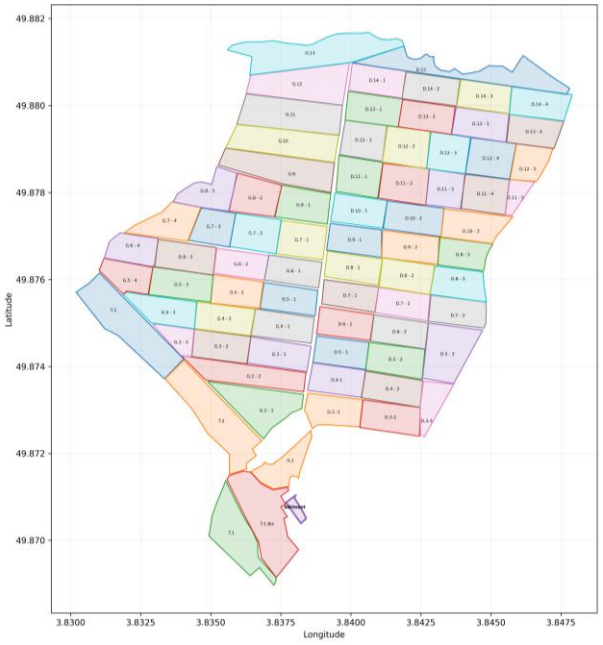
Sensor-based approach: combining position, behaviour and farm maps



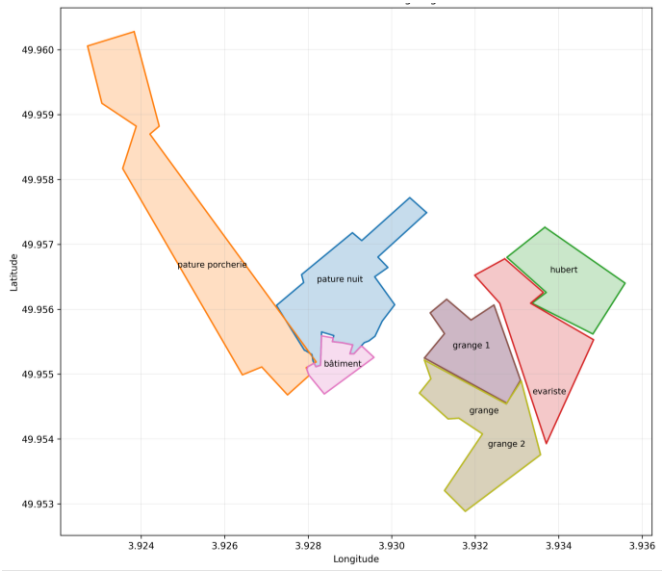


- **High-frequency GPS collar**: position every second (Tauro from Embeint)
- **Accelerometer-based behaviour**: grazing / non-grazing (E-Grazor developped by CSIRO)
- **GIS layers**: barn polygon, paddock boundaries, grazable areas
- Study area: 5 **dairy farms in the Maroilles PDO cheese area (Northern France)**

2 constrasting grazing systems

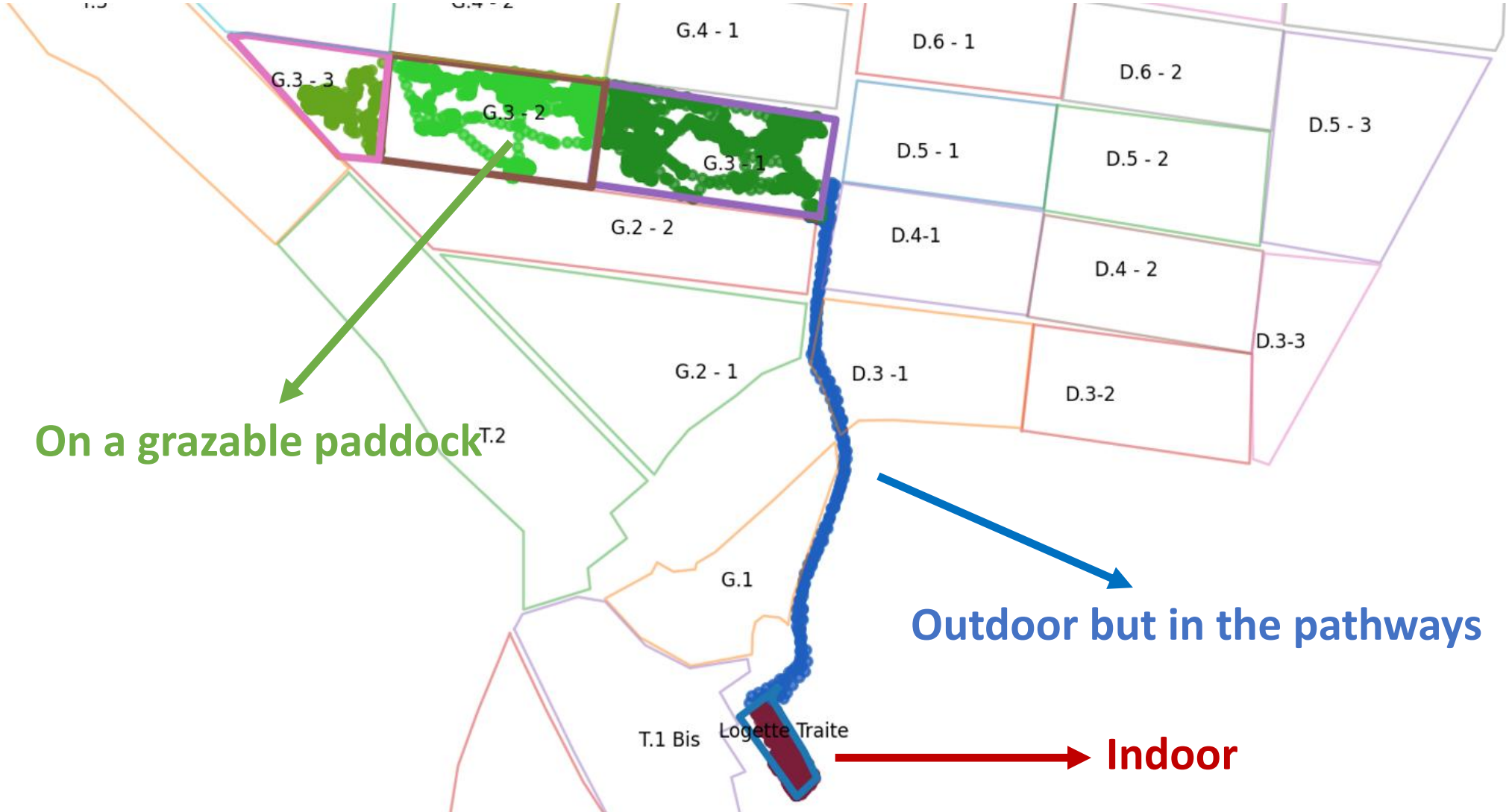




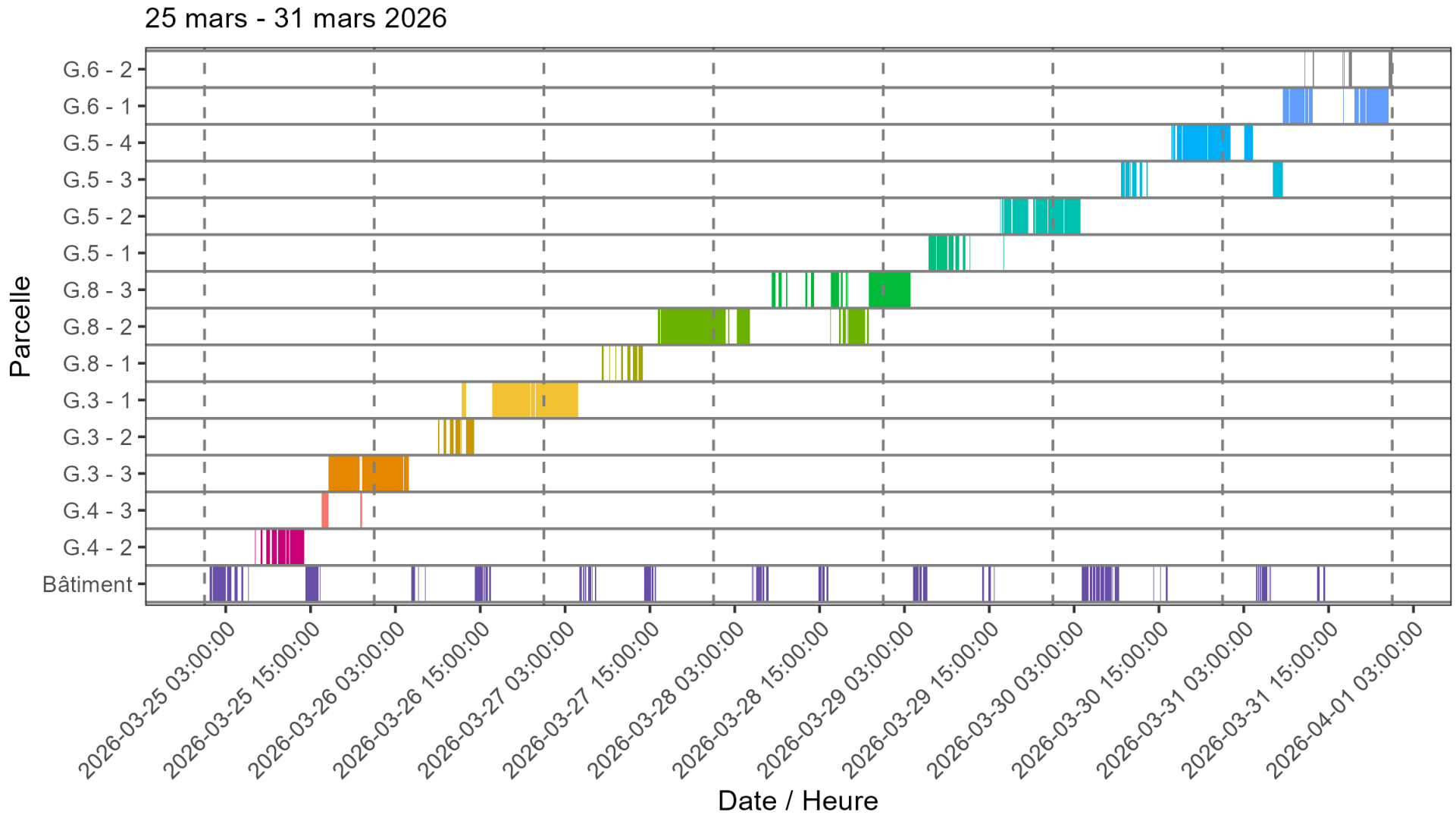


- Farm A: **dynamic rotational grazing**
- Farm B: **simplified grazing management**
- One representative cow equipped per farm
- Monitoring period: around 3 months
- Objective: demonstrate the type of indicators that can be produced

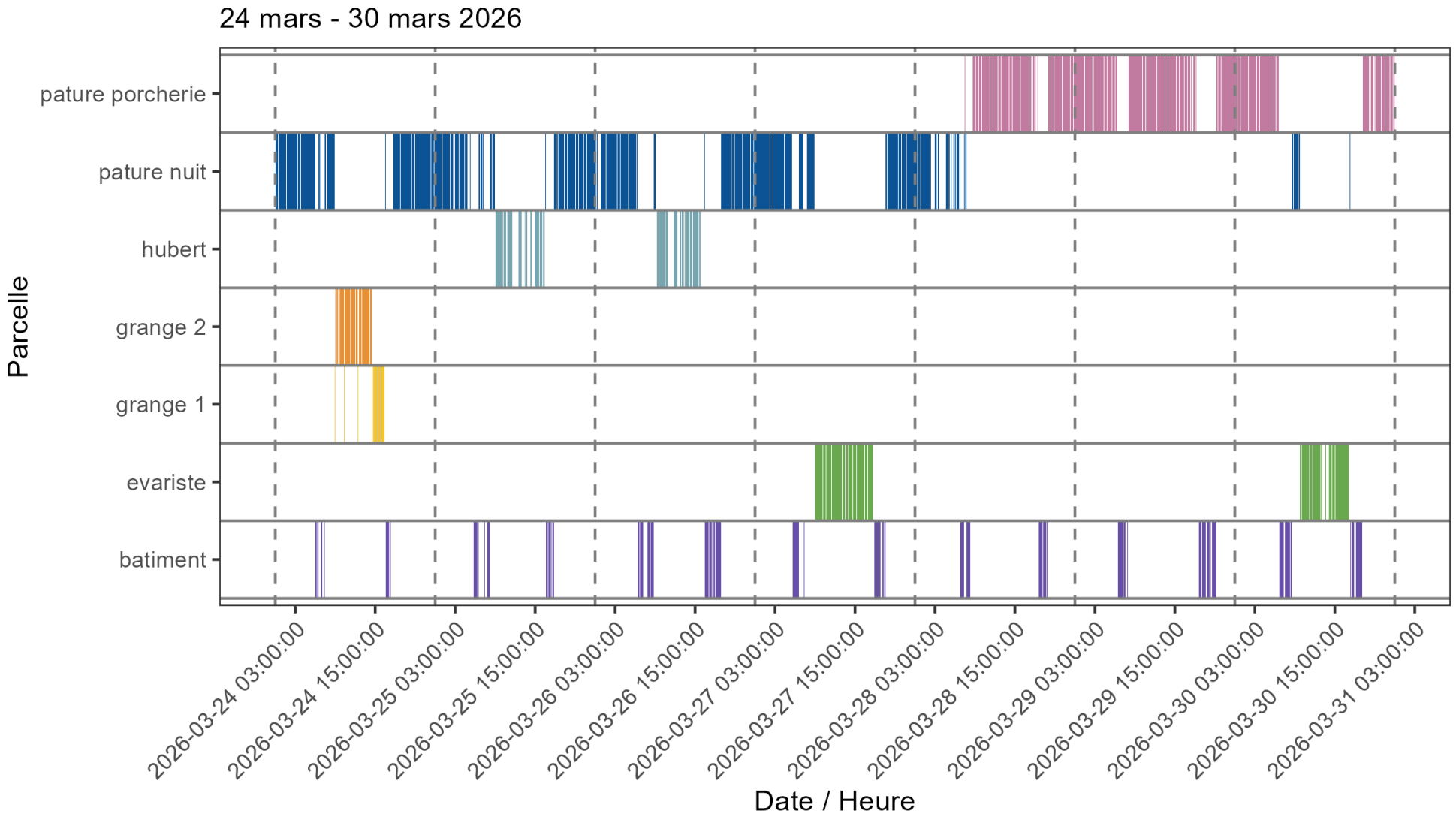
What GPS data tells us ?



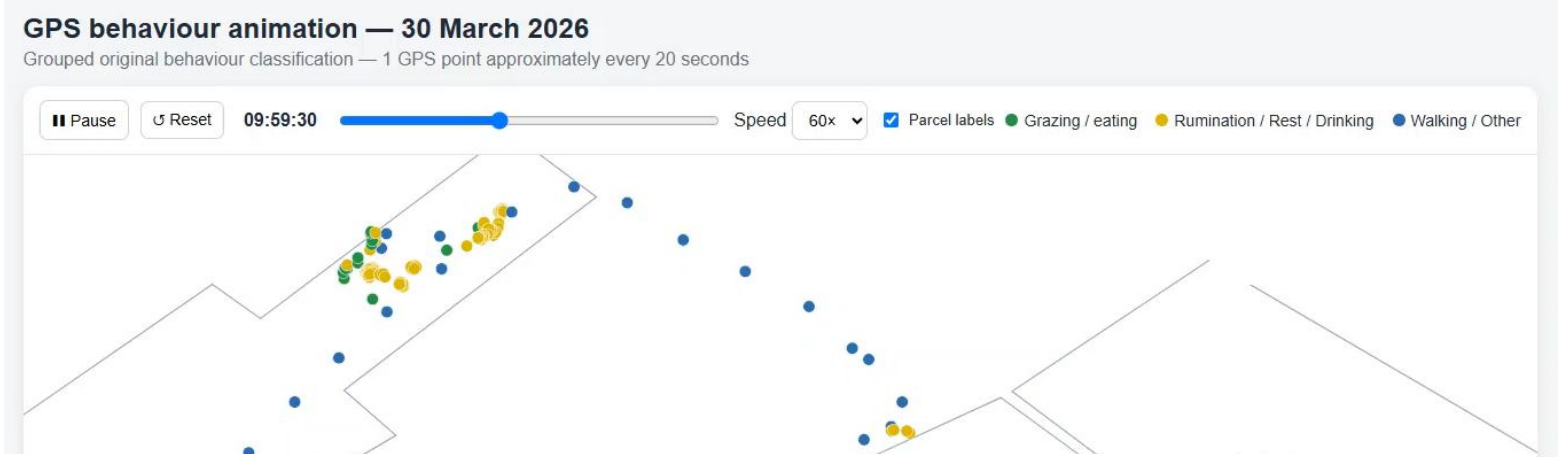
Grazing calendar – Farm A



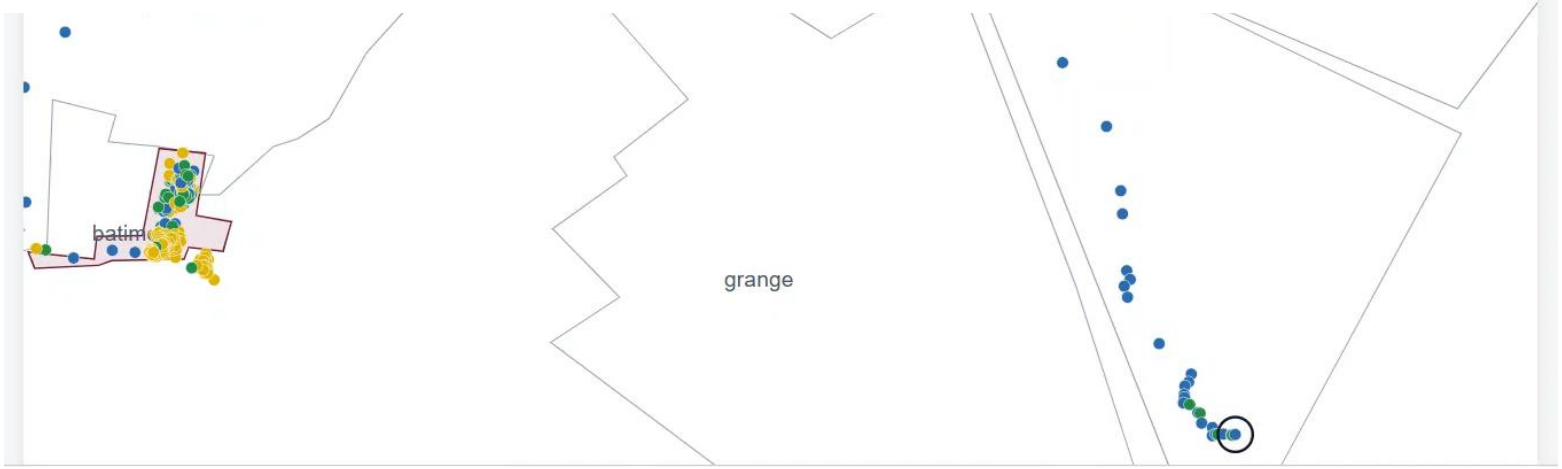
Grazing calendar – Farm B



What accelerometer data adds ?



Effective grazing = location in grazable paddock + grazing behaviour



From sensor data to fine grazing traceability

Daily Summary — March 25–31, 2026

SCEA Fontaine Orion

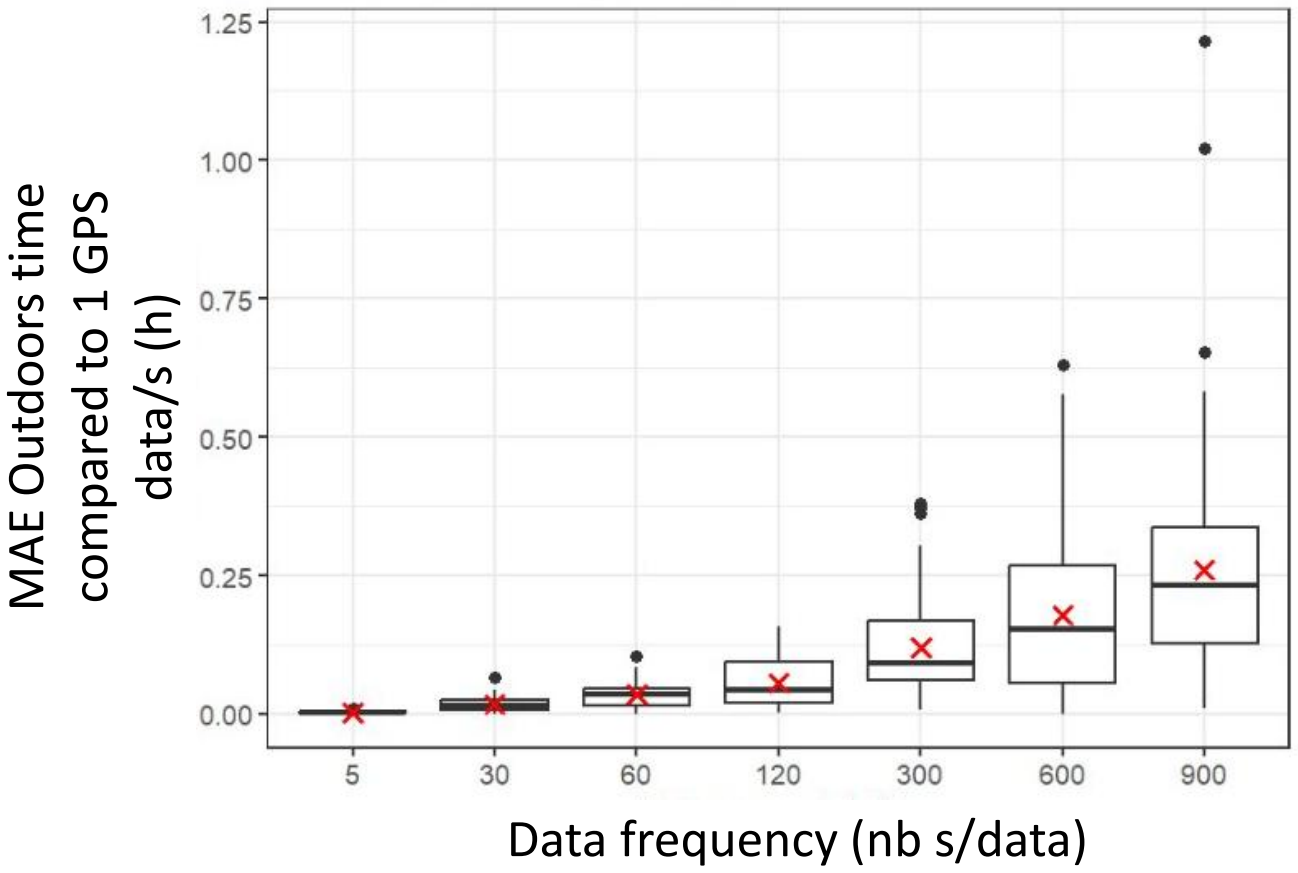
Date	Barn (h)	Outdoors (h)	Grazable paddock (h)	Accessible paddocks	Accessible area (ares)	Effective Grazing (h)	Distance Travelled (km)
25 Mar	7.3	16.7	14.6	3.0	2.57	4.51	5.09
26 Mar	4.2	19.8	18.3	3.0	2.55	4.61	5.33
27 Mar	3.6	20.4	18.7	3.0	3.18	4.67	6.96
28 Mar	2.8	21.2	17.1	2.0	2.11	3.82	5.44
29 Mar	3.5	20.5	17.2	3.0	2.87	5.59	4.45
30 Mar	7.2	16.8	14.7	3.0	2.87	4.87	5.61
31 Mar	3.3	20.7	16.3	4.0	3.73	4.59	4.66
Average	**4.6**	**19.4**	**16.7**	**3.0**	**2.84**	**4.66**	**5.36**

✅ **Compliant with PDO specifications**

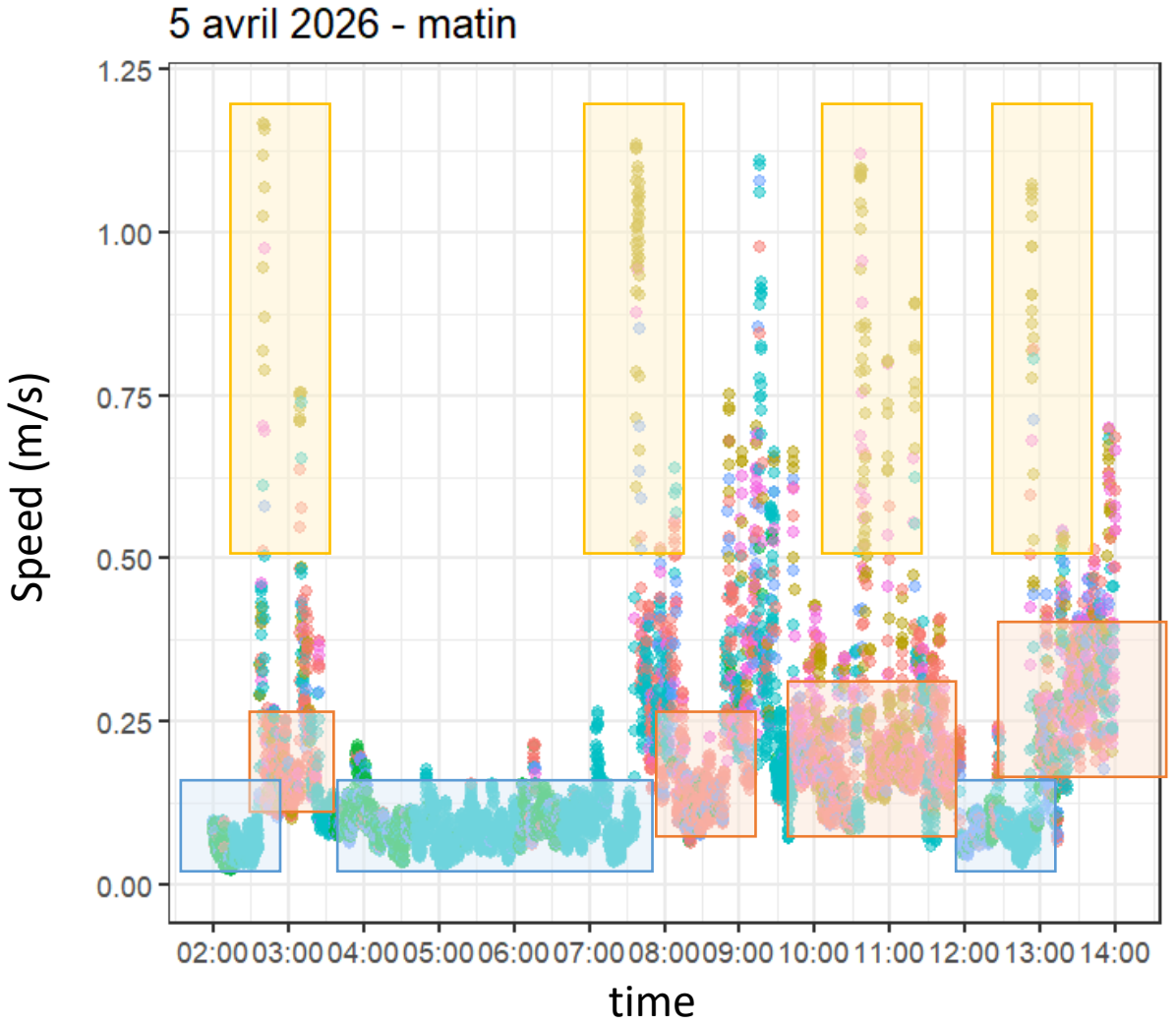
Next steps: How much information do we really need ?

Quantify impact of GPS frequency degradation

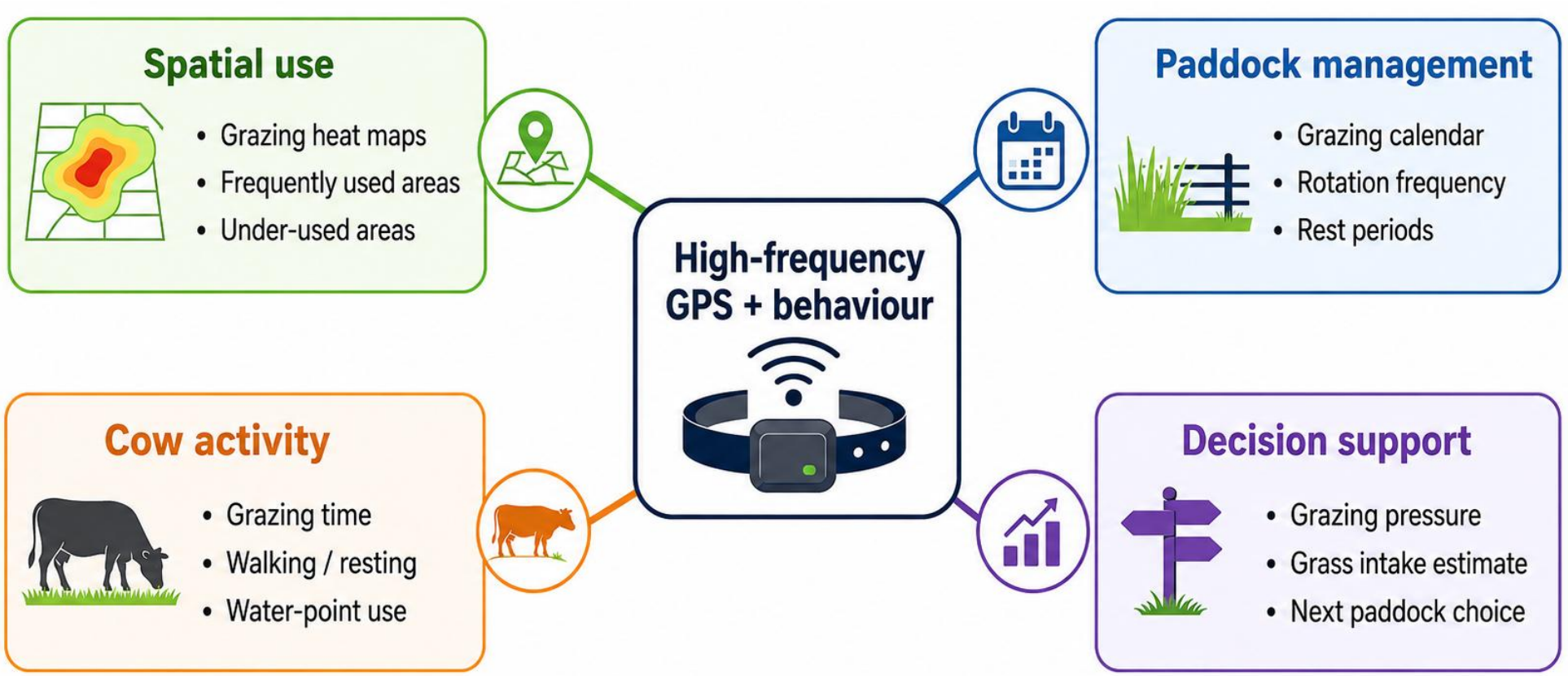
Accuracy ↔ Battery life ↔ Data transmission ↔ Cost



Next steps: test GPS-only proxies using speed and trajectory tortuosity



Next steps: from traceability to actionable grazing information



Take home messages

- 1. Grazing traceability requires more than detecting outdoor presence.
- 2. High-frequency GPS + accelerometry can describe where, when and whether cows actually graze.
- 3. The next challenge is to identify the minimum amount of data required for reliable and affordable monitoring
- 4. What additional services for grazing management ?

Thank you for your attention

View the slideshows of our conferences at

idele.fr



