



LIFE18 NAT/IT/000972 LIFE WolfAlps

Innovative livestock protection: Herd monitoring with positioning systems and drones

Thematic conference, 13. – 15. Juni 2022

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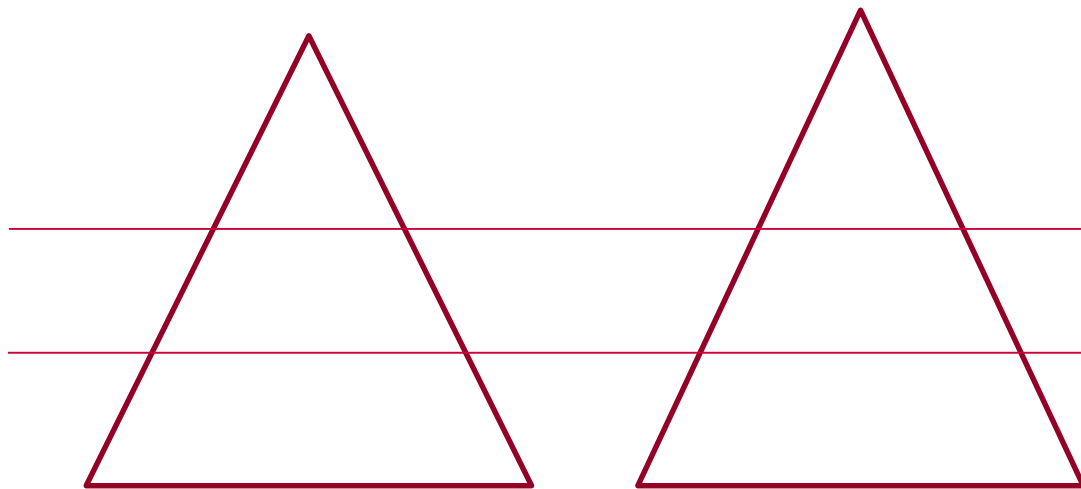


GPS



Drone

Locations

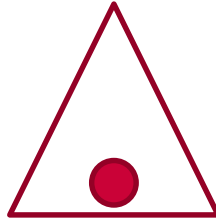


Extensive alpine pasture

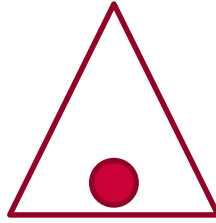
Temporary settlement space

Permanent settlement space

Permanent settlement space



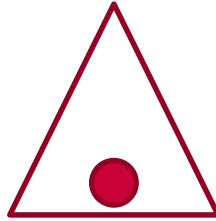
Permanent settlement space



Monitoring and Control

- Direct observation (Day)
- Natural boundaries
- Fencing (wolf-proof)
- Barn management (Night)

Permanent settlement space



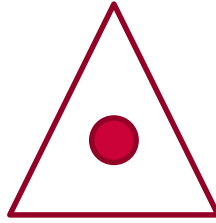
Endangerment

- April-May/September-
November high
- Loss of security

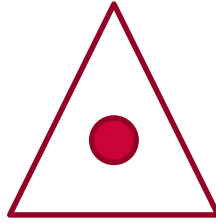


no security contribution
no management effect

Temporary settlement space



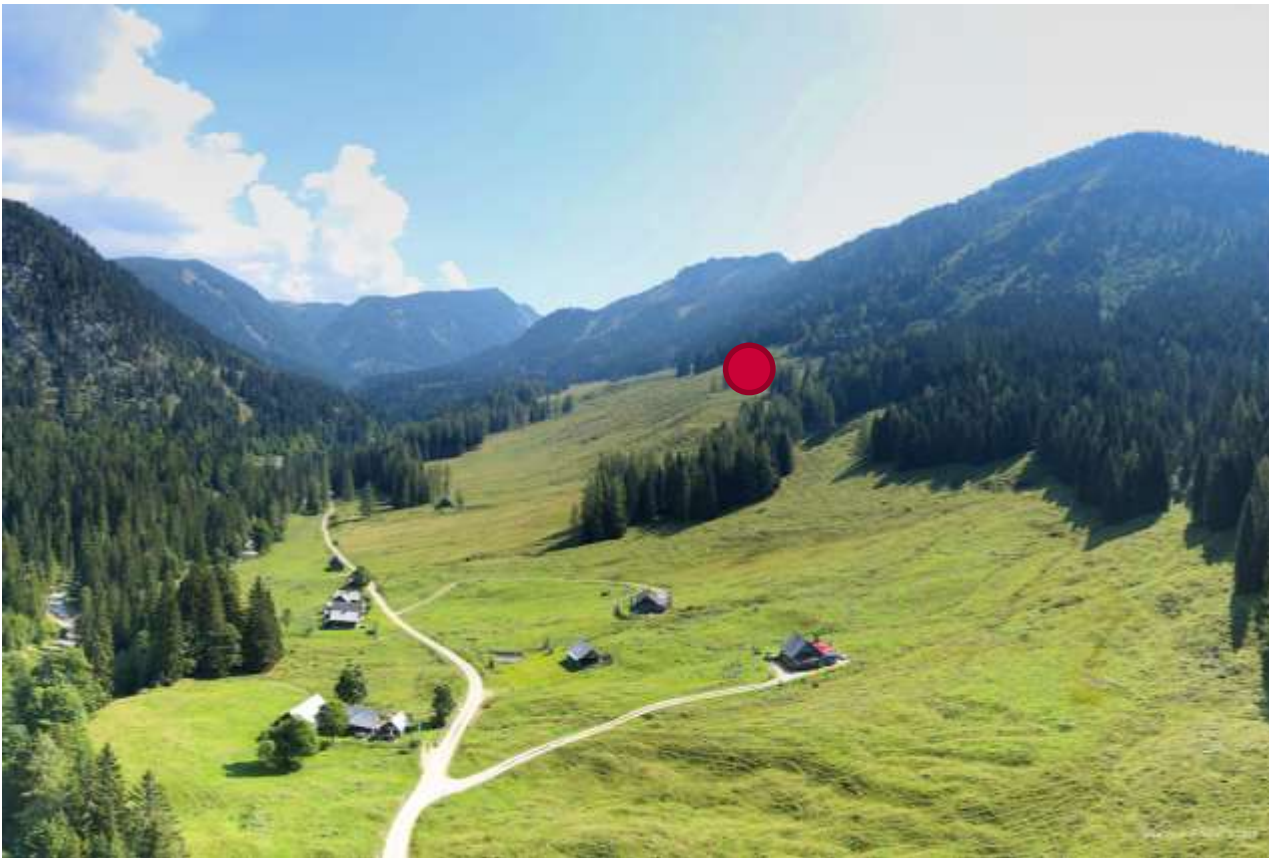
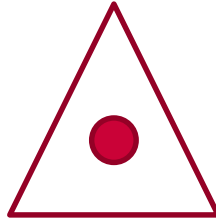
Temporary settlement space



Monitoring and Control

- Direct observation by **herdsman** on daytime
- Wolf-proof fencing of selected willows for nighttime
- Barn management (Night)

Temporary settlement space



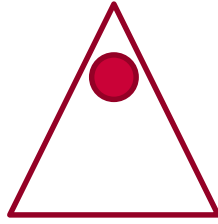
Endangerment

- June - September
- Labour and Cost maximisation

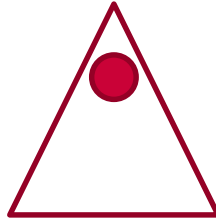


no security contribution
good management effect

Extensive alpine pasture



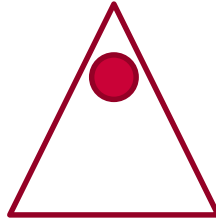
Extensive alpine pasture



Monitoring and Control

- Direct observation by **shepherd** on daytime if possible.
- Wolf-proof fencing of small plots for nighttime.

Extensive alpine pasture



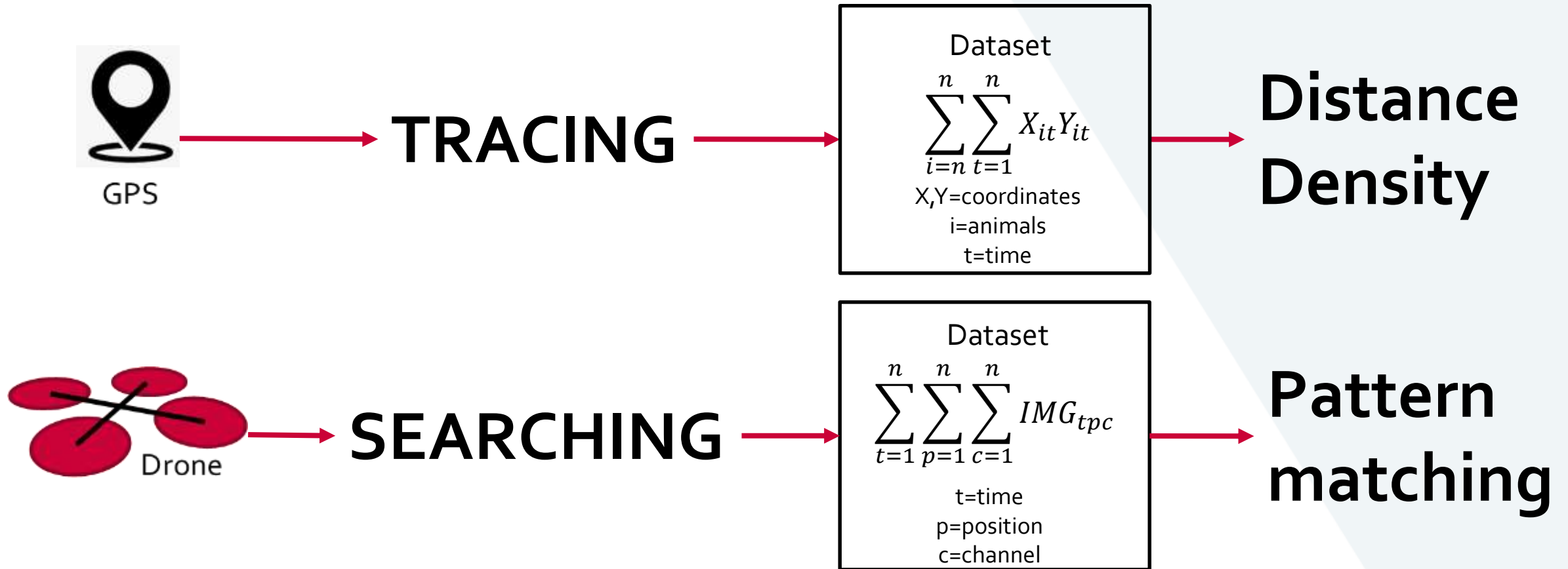
Monitoring and Control

- June - September
- Abandonment (if no shepherd)



no security contribution
good management effect

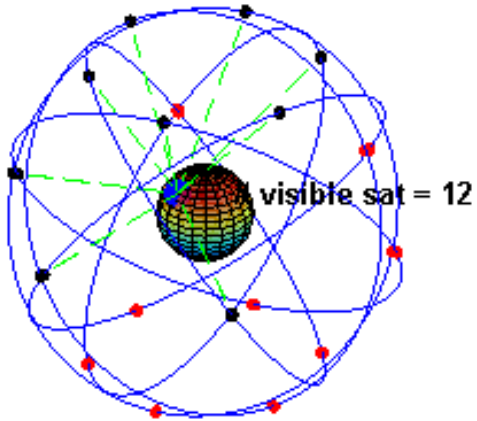
What can digital tools do for alpine pasture management?



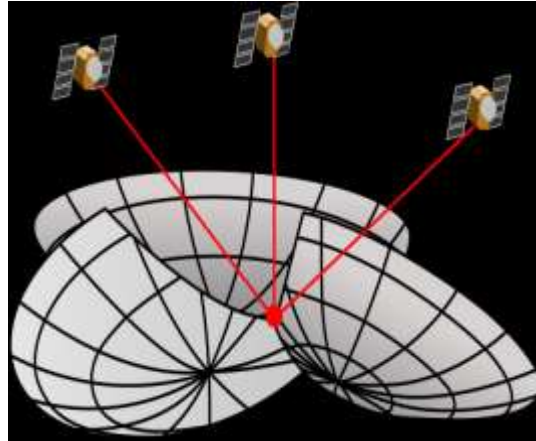


GPS in use → The workflow

Signal generation → Interpretation → Send/Store → Mapping



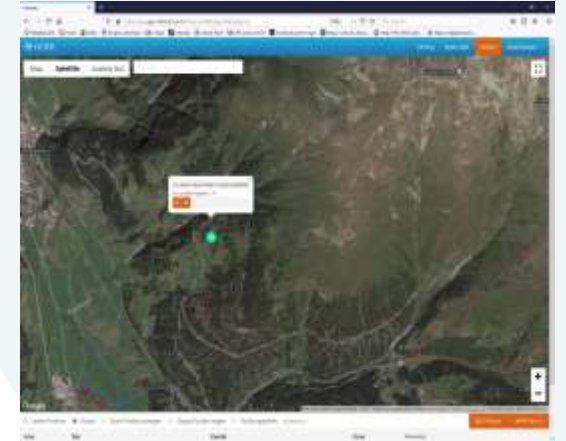
Completed



Completed



Partly Completed



Completed

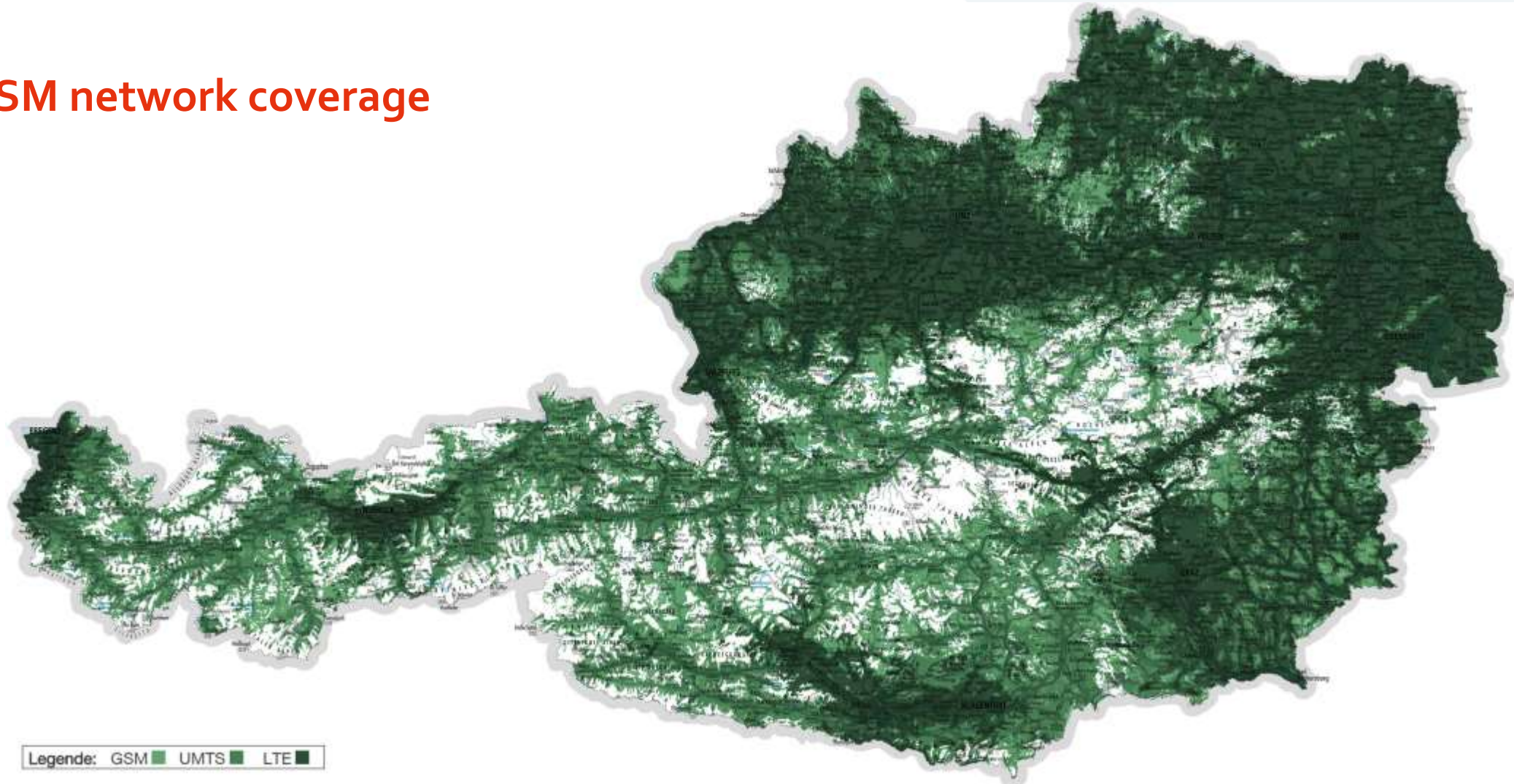
Interpretation and sending → The devices

Developed for the
automotive industry



Herd monitoring with positioning systems and drones

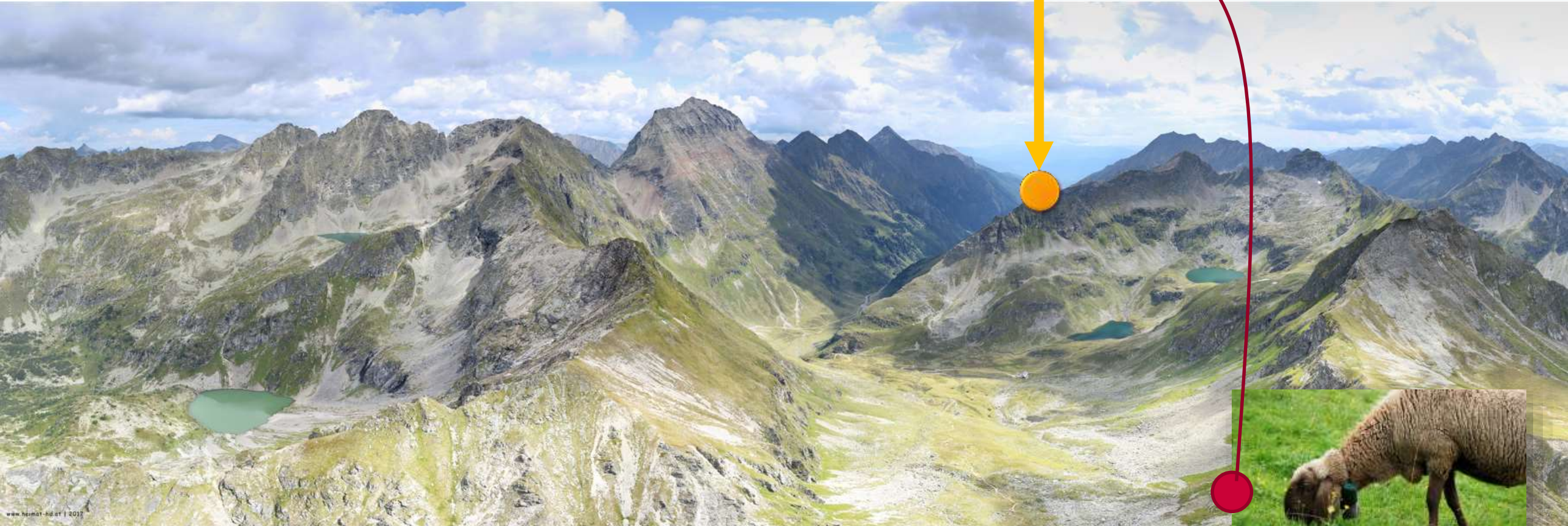
GSM network coverage



Benefit I → Tracking for animal search

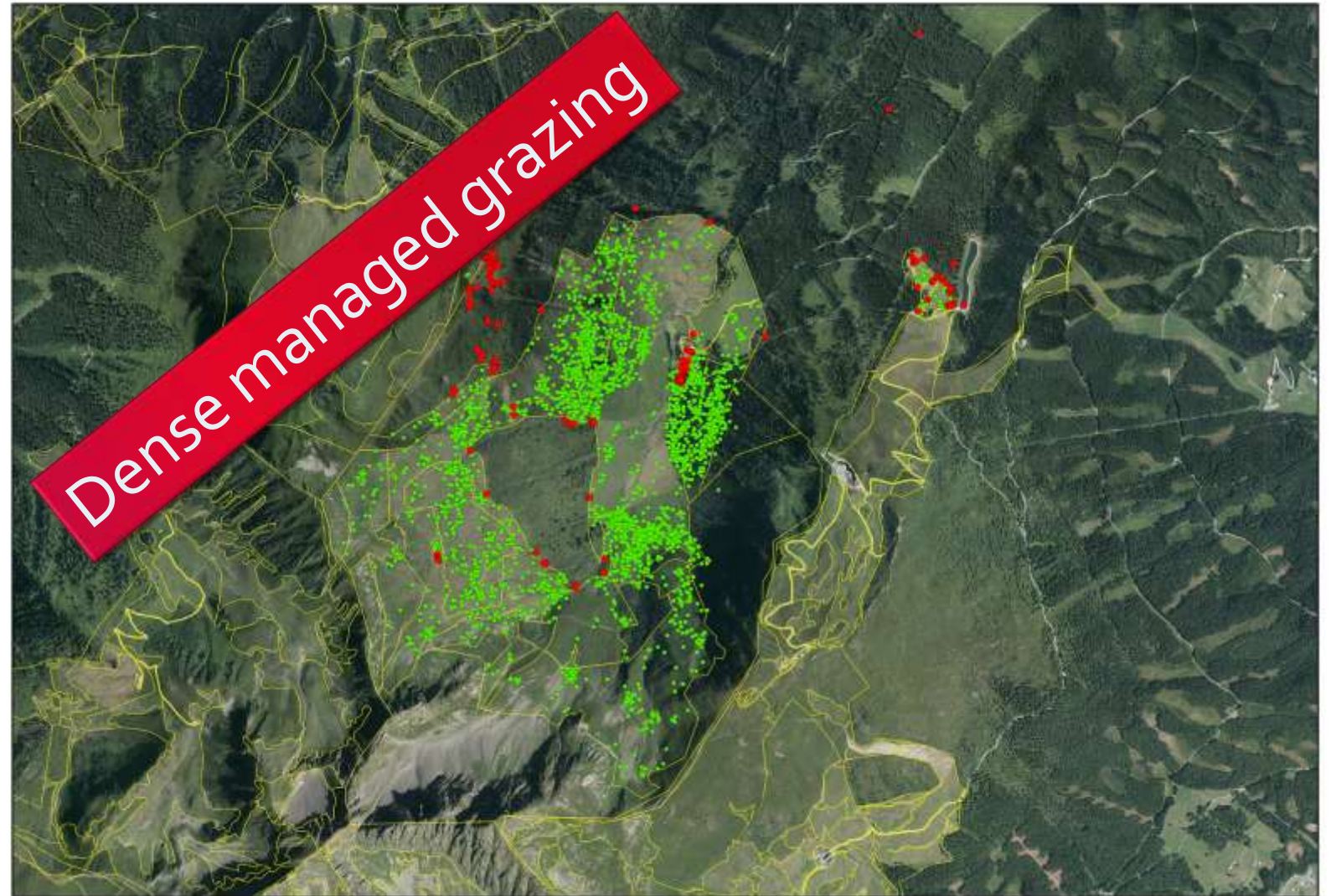
Farm

GSM-Signal, X,Y



Herd monitoring with positioning systems and drones

What 900,000 points tell us

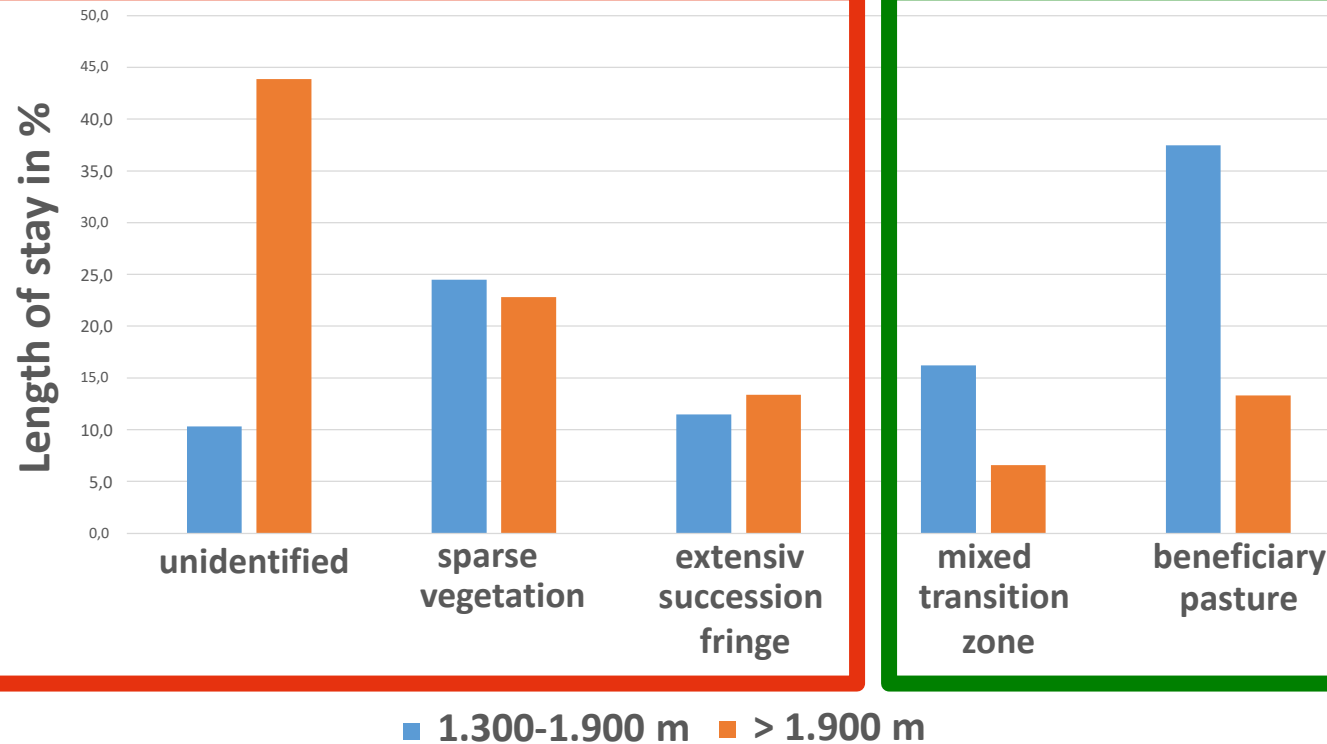


What 900,000 points tell us



What 900,000 points tell us → The analysis

Distribution of the duration of stay of 253 grazing animals with GPS loggers on different alpine pastures and locations



Up to 2/3
not well
guarded

Up to 1/3
well
guarded

Benefit II Rotation and feeding plan for a flock in managed grazing

Gemeinsame Schafalpfung der Gemeinden Pfunds, Fließ und Spiss

ENGE Weideführung

**Dr. Thomas Guggenberger
Ing. Reinhard Huber
DI Andreas Klingler**

DI Josef Gitterle

Simon Moser M.Sc

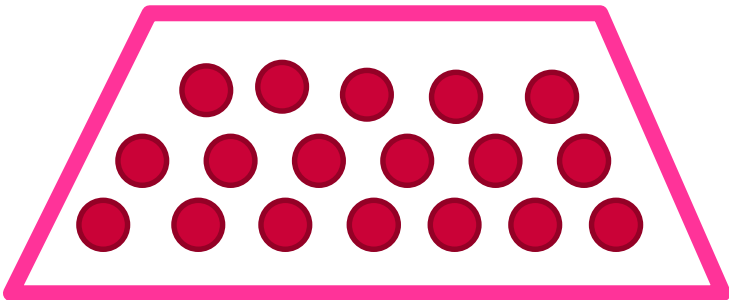
DI Peter Martl MAS

 HBLFA
Raumberg-Gumpenstein
Landwirtschaft



Interaction analysis and research question with GPS-tracker in Wolfsalp 2022

Moving windows:
Form and inner
distance



**Large number of GPS
devices in a flock with
shepherd**

- Moving window grazing time
- Moving window ruminant
- Moving window night pen
- Anomalys
 - Change of weather
 - Attacks
 - ...

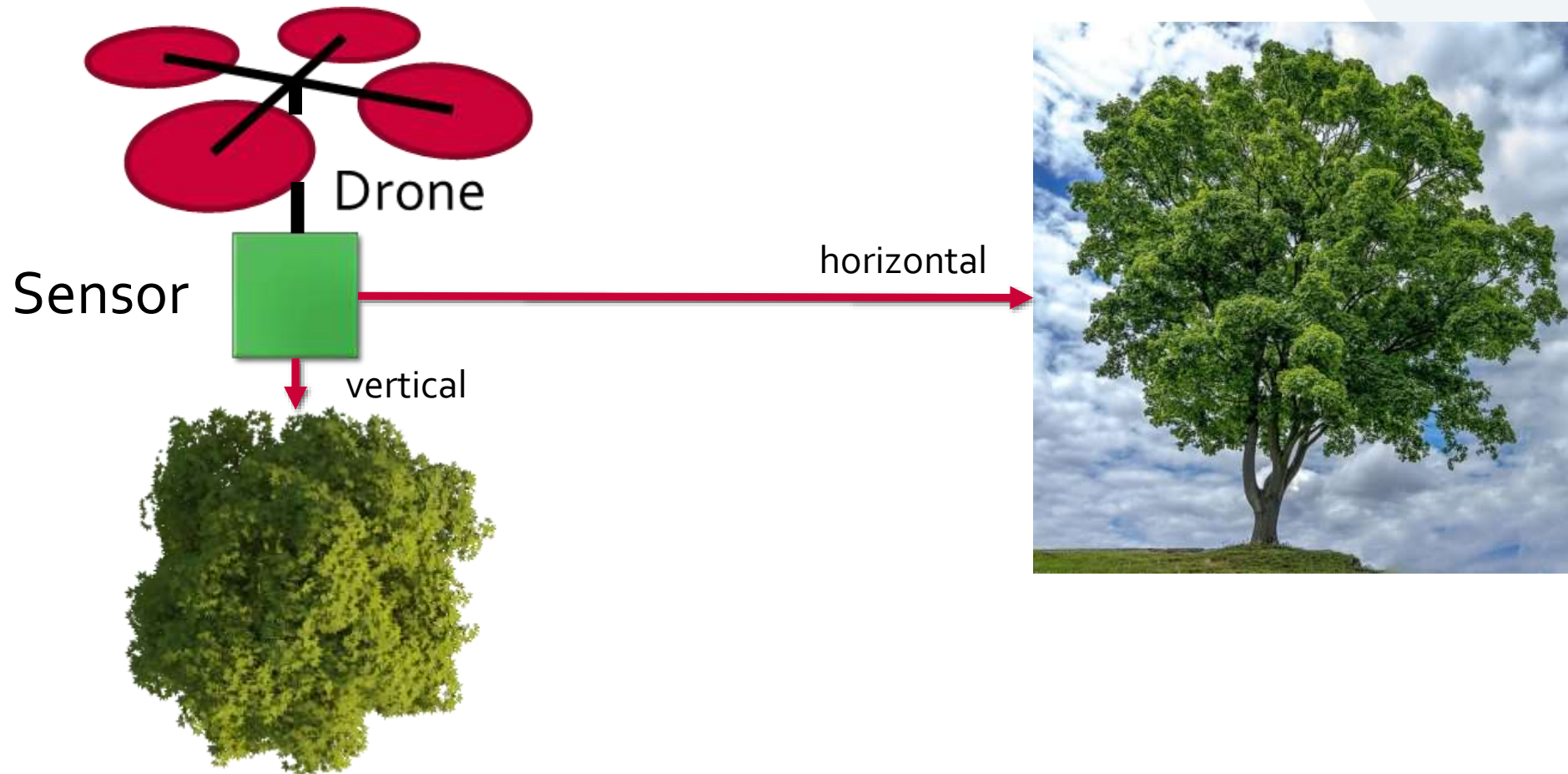
Drone in use → The function and technology



Drones see better than people, because:

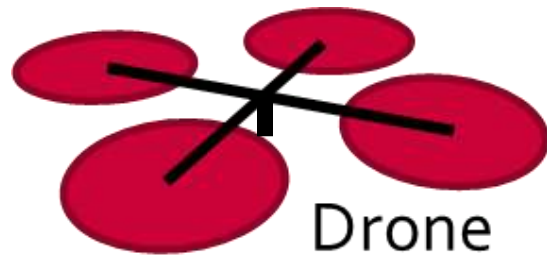
- they can easily adjust their viewing angle.
- they can use different sensors.
- they can store a large amount of information that can be post-processed.

Drone in use → Viewing angle



Herd monitoring with positioning systems and drones

Drone in use → Wide and fast movement space



DJI Mavic 2 Enterprise Advanced

- Climb speed: 4 m/s
- Flight speed: 50 km/h
- Flight time: 25 Minutes
- Remote control range: 6000 Meter

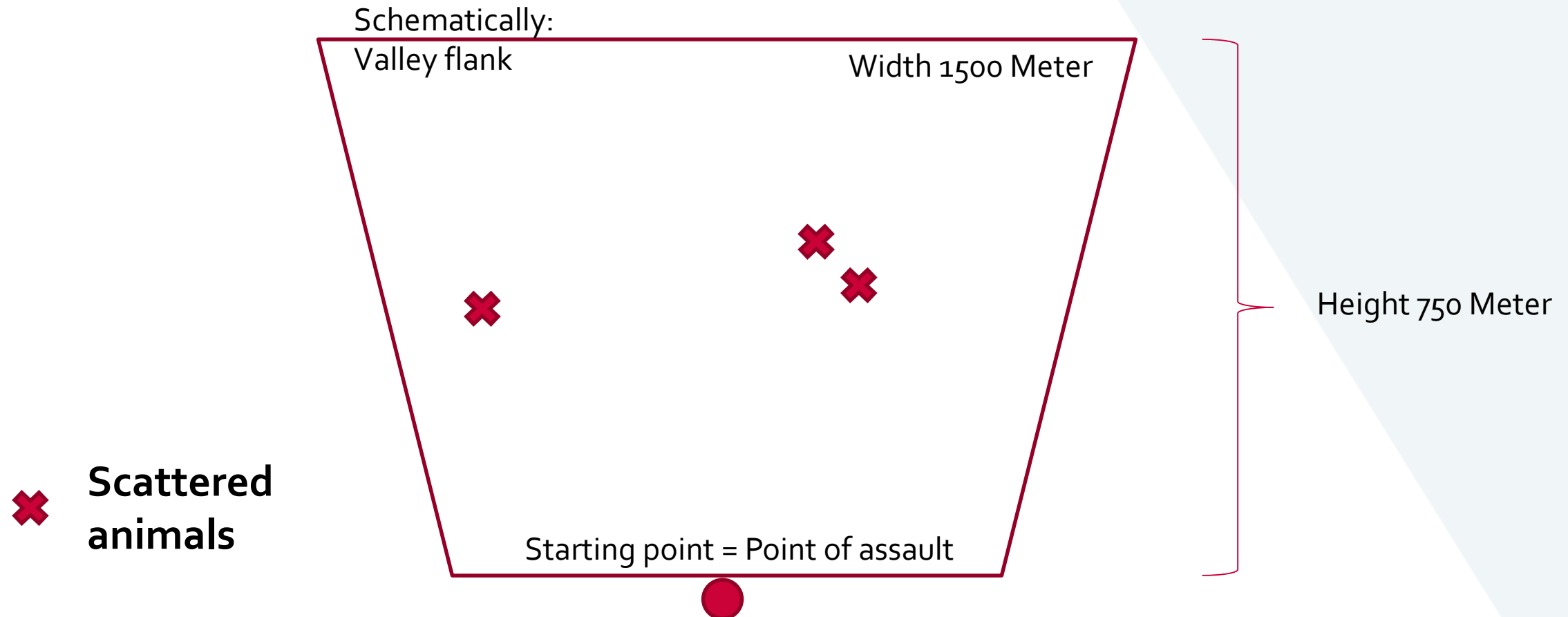
Be aware of your national laws!

Drone in use → Thermal sensors



Herd monitoring with positioning systems and drones

Use case → Wolf attack Rauris/Austria 07.06.2021



Summary

- **GPS** tracking has proven itself for the management of herds. It facilitates the search for the animals and provides excellent data for pasture planning of the alpine pastures. Tracking does not provide protection against wolf attacks, but the movement patterns after special events can support herd protection in the future.
- **Drones** facilitate the search for scattered animals through their large area coverage and modern sensors. Drones are recommended for use after wolf attacks. Drones do not provide herd protection.



Thank you for your attention