Figur 1 Drones are increasingly used in traditional reindeer herding. Foto: E Winje, NIBIO.

AirHerd
Drone use in reindeer herding

The introduction of unmanned aerial vehicles (UAV), or drones, to traditional reindeer herding has – literally – given indigenous Sámi herders a new perspective: the aerial one.

Areas of hard-to-reach reindeer rangelands can now be accessed through drone cameras, and drones can make finding, collecting and driving reindeer easier.

AIR HERDING
This small-scale project funded by Interreg Aurora allowed Mid Sweden University (MIUN) in Sweden, the Norwegian Institute for Bioeconomy (NIBIO) in Norway and six reindeer herding areas on either side of the border to map reindeer herders' experiences with drone technology in traditional reindeer herding. The aim was to improve cross-border knowledge exchange and co-create ideas for large scale research projects covering herders' requirements for the future.

Figur 2 A light drone fits into a backpack and can easily be used to survey inaccessible terrain. Foto: G Wagner, NIBIO.

MAPPING DRONE USE

Drones are light and mobile *ad hoc* tools. They fit into a backpack which can easily be transported into difficult terrain and can fast reach areas dangerous for people or helicopters.
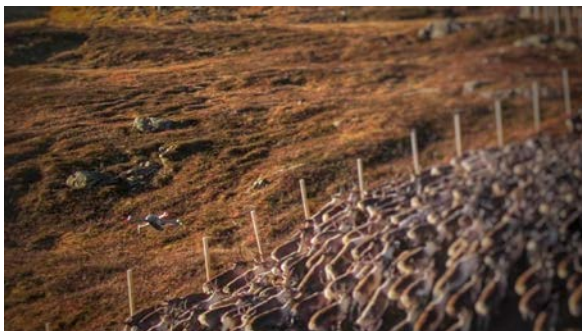
Figur 3 Drones can find and herd reindeer from rangelands towards fences (left). A herd is driven into a fence by two drones instead of four ATVs (right). Foto: T Wagner

Drone operations support herders in:

- finding and collecting animals in challenging terrain
- moving animals (away from predators, agriculture, avalanche terrain, traffic or between seasonal pastures)
- monitoring predators
- monitoring reindeer behaviour and health

- finding and documenting animal losses
- checking fences and herding infrastructure
- Finding suitable pasture or safe migration routes.

The aerial view of the drone enables significant savings in work time, physical strain, fossil fuels and costs.

Figur 4 Drones can be used to chase animals out of dangerous situations such as avalanche exposed terrain (top left), to monitor animal behaviour at close range in inaccessible terrain or during bad visibility (top right), to find animals in forested areas in which the ground view offers too small a perspective (bottom left) or to find and move animals in large open rangelands (bottom right). Fotos: N O Oskal.

TRADITIONAL KNOWLEDGE

Experienced herders using drones also report a gentler approach to driving animals with a drone compared to a helicopter. They themselves can perform drone operations in combination with their traditional knowledge of reindeer behaviour. They have observed reduced stress and strain for the animals compared to helicopter use.

DRONES REDUCE CO_2 EMISSIONS

In previous years helicopters were used to find, drive and count reindeer. These costly operations can now at least partly be replaced by drone use.

The potential reduction in CO_2 emissions based on decreased helicopter use is significant and could be measured in tens of tonnes in a best-case scenario.

The potential for reduction depends on the type of helicopter and varies in time and space with helicopter type availability.

VISIONS OF THE FUTURE

Using drones instead of helicopters will not only decrease CO_2 emissions, but also contribute to improved animal welfare, increased health and safety for the herders together with decreased costs due to less fossil fuel use and off-road-vehicle maintenance.

Soon drones will count reindeer with the help of AI in the visible and thermal spectrum.

Challenges include legal obstacles to drone use beyond line of sight, investment costs and operator education.
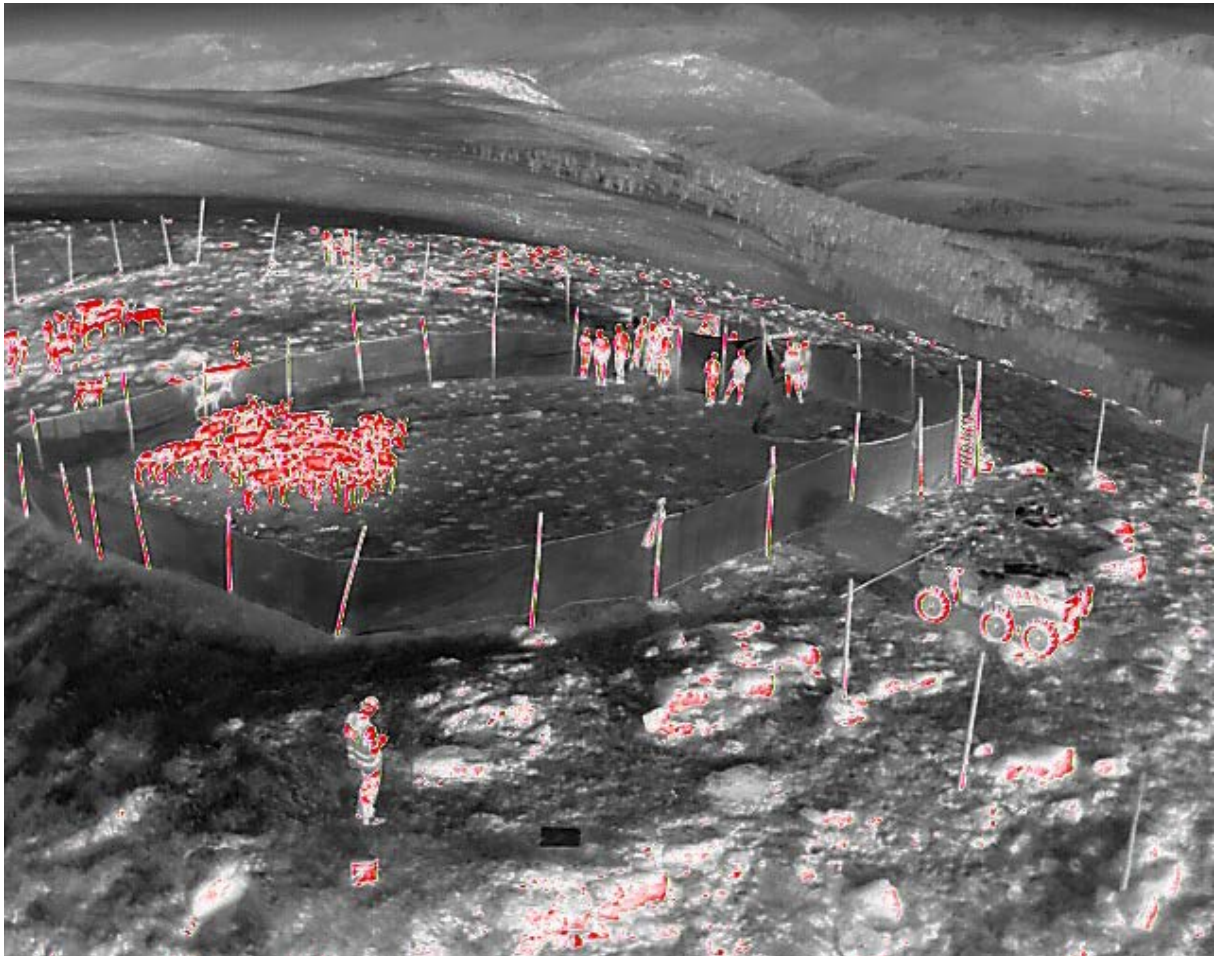
Figur 5 Infrared picture of herders with a herd of reindeer calves. Will an artificial intelligence algorithm soon be able to count the reindeer? Foto: H H Lislegård, NIBIO.

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