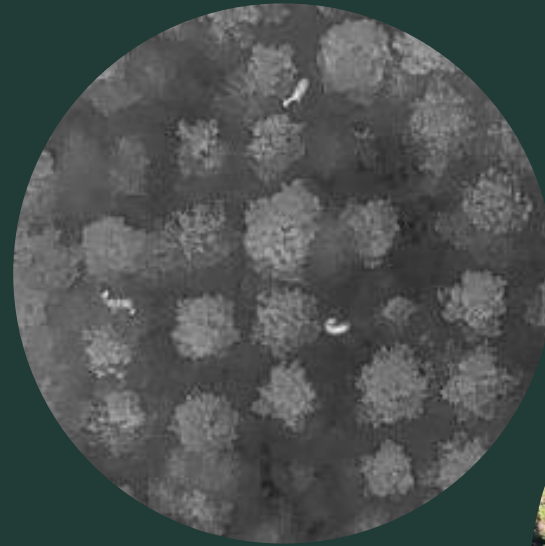


Using thermal imaging drones to count deer in woodland

The story so far...



The drones....

- There's at several drones easily available.
- Highest spec has 3 cameras; TI, wide angle and zoom lens.
- Built in laser range finder on some models
- Ability to operate in wind and rain.
- Battery life main constraint.
- Upkeep and maintenance costly and time consuming.
- Heavily regulated when flying 'commercially'.



The operators....

- GVC
- A2 C of C
- Operational authorization
- Flyers ID/Operators ID
- Risk Assessment
- Method statement
- Checks with Drone Apps
- NATS – liaison with airports etc
- CPD – keeping hours up
- Maintenance of equipment



Methodologies

- Scottish Forestry – approved first method in May this year.
- Minimum count has limitations depending on the structure of the habitat and size of the site.
- Other methods being looked at with NatureScot and Forestry Commission England project (Lincolnshire).

Drone thermal imaging census methods – Minimum count Wildlife Management



Picture 1: Image series – Thermal image, wide angle and zoom lens - photographs taken simultaneously by drone.

Minimum count

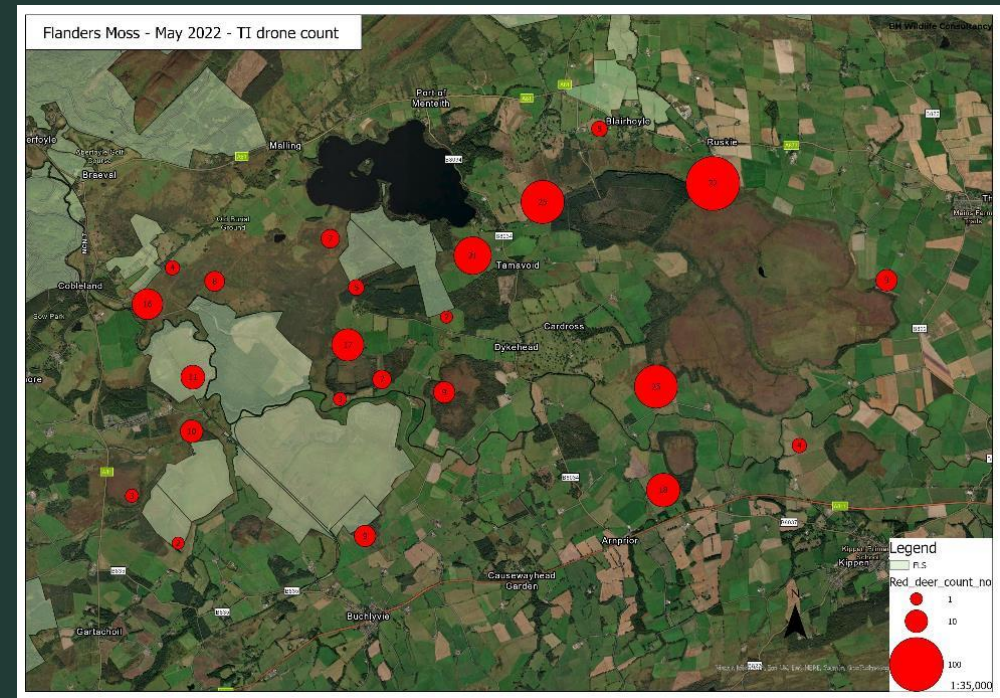
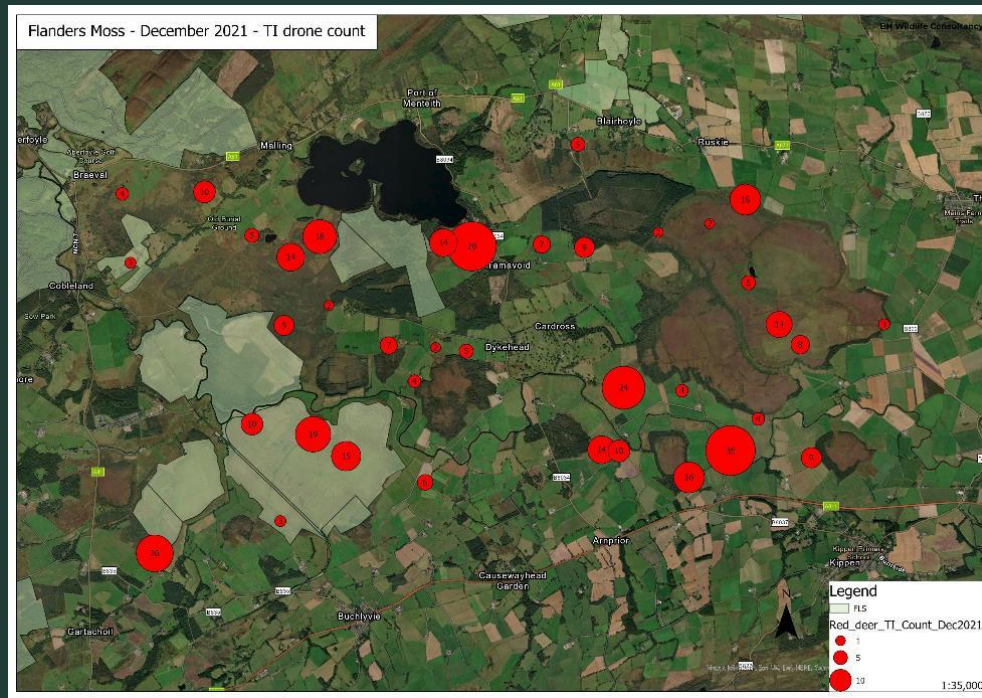
- You attempt to count all of the ground as you can in a methodical way to avoid under counting and double counting.
- If in doubt – don't count...
- This provides a 'snapshot' of density and distribution at that given time.
- When compared to other methods – time saving, efficient (one person) and repeatable.
- The results are geo-referenced and time/date stamped meaning that the images are true evidence of the population present at that given time.



Plot based counting – Muntjac? Sika?



The census...



A thermal image of a forest landscape. A dark, dense line of trees runs diagonally from the top left towards the bottom right. The surrounding areas are lighter, indicating open ground or less dense vegetation. Several small, bright white spots are visible along the tree line, likely representing heat signatures of animals. The overall image is in grayscale with a thermal overlay.

Red Stags

Thermal
Camera

An aerial photograph showing a dense forest of evergreen trees. A distinct, diagonal boundary runs from the upper left towards the lower right, separating a darker, more uniform forest on the left from a lighter, more sparse forest on the right. The trees on the right appear to be younger or less dense. The text "Wide angle" is overlaid in white on the right side of the image.

Wide angle

An aerial photograph of a forest landscape. In the upper left, a herd of elk is gathered on a clearing with dry, yellowish-brown grass. The rest of the image is filled with dense evergreen trees. The word "Zoom" is written in white text on the right side of the image.

Zoom



Sika Hind

Thermal
camera

An aerial photograph of a hillside. The left side of the image shows a slope with reddish-brown soil and numerous small, green, bushy plants growing in rows. The right side of the image shows a steeper slope covered in a dense forest of green trees. The text "Wide angle" is overlaid on the right side of the image.

Wide angle

A photograph of a deer standing in a forest. The deer is positioned in the lower center of the frame, facing left. It has a brown coat and small antlers. The forest is dense with green foliage and thin tree trunks. The word "Zoom" is written in white text on the right side of the image.

Zoom

Fallow Deer

Thermal
Camera



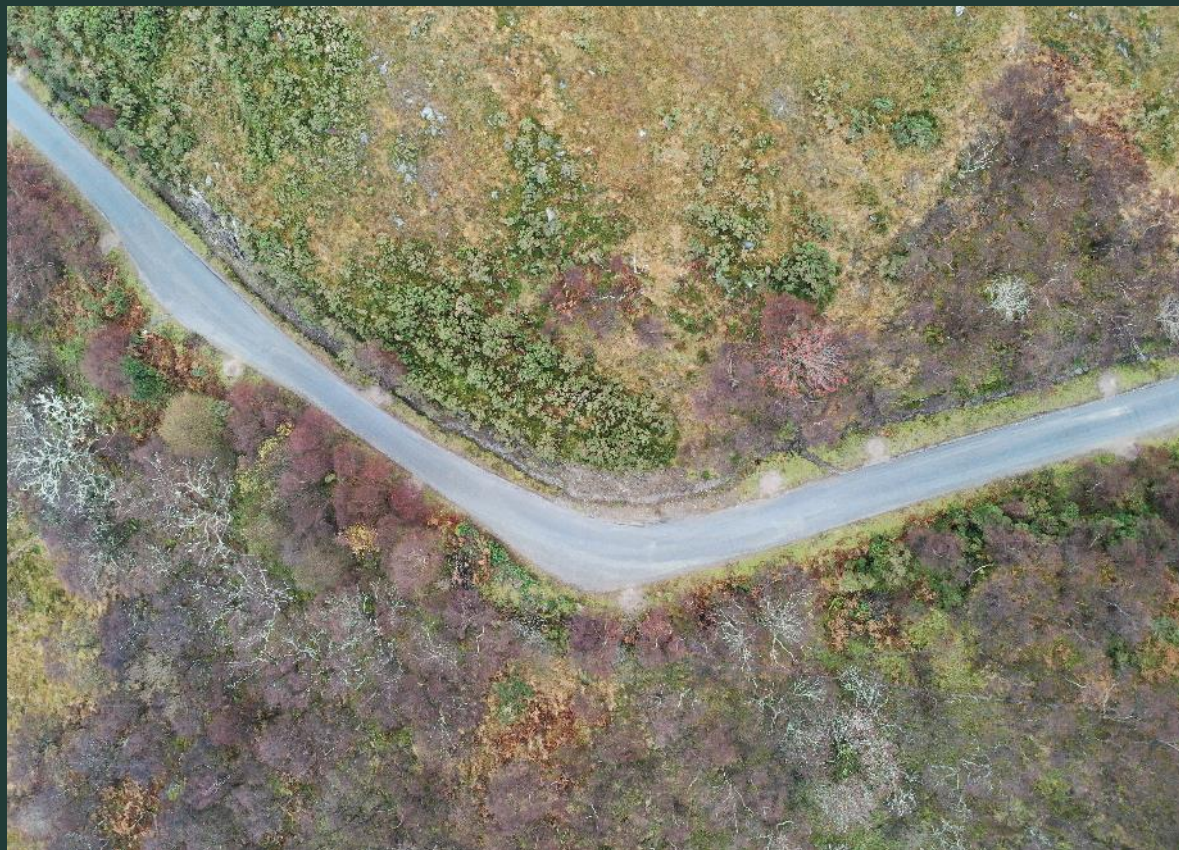
An aerial photograph of a forest. A dark, straight road or path runs diagonally from the top center towards the bottom right. The forest is composed of various types of trees, including dense green evergreens on the left and more sparse, brownish deciduous trees on the right. The text "Wide angle" is overlaid in white on the left side of the image.

Wide angle

Zoom



Secretive Sika!



Secretive Sika!





Reviewing the
evidence

A few fallow



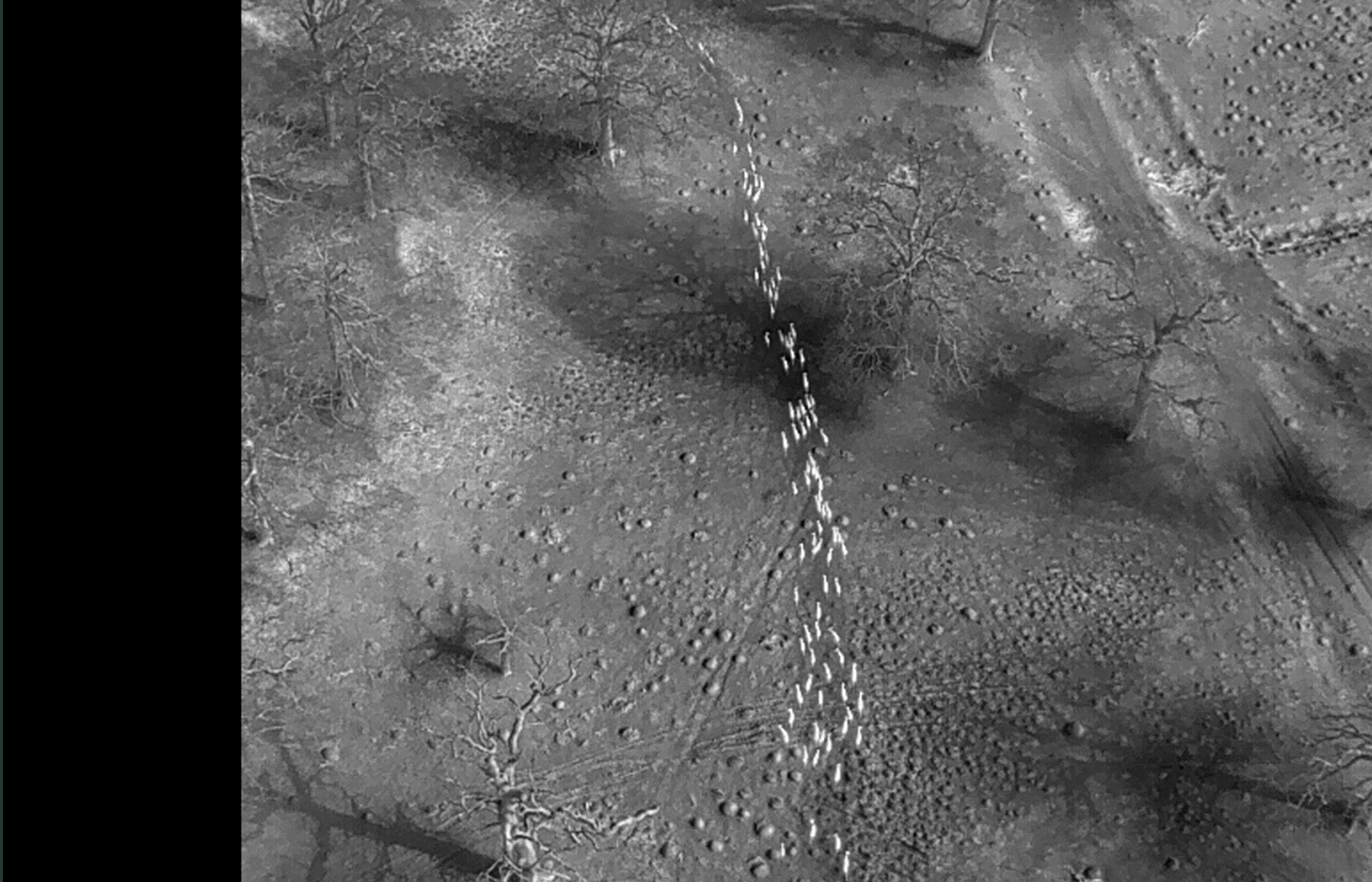
Calibration in deer parks

Waiting for approval to publish figures but essentially three species surveyed in 1,000 hectares.

- Sika – number counted slightly less than foot count
- Red – figures exactly accurate to a single deer
- Pere David – more than suspected

Repeat counts on different species to continue this year.

Calibration in deer parks



Future

- Improved methodologies
- Better thermal imagery
- Longer battery life
- Smaller drones
- Artificial Intelligence....
- Its just the beginning

