GPS-tagging & drone-monitoring

→ new knowledge on the secret life of Fulmars & other seabirds

Organization

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What is it all about – *Research objective and aims*

Utilization of GPS-tracking and drone technology to tackle challenges in traditional seabird monitoring

- Difficult terrain with steep and inaccessible cliff sides

Today's talk (two parts):

- GPS-tracking of breeding Fulmars – Havhestur
- Drone surveys of Mykineshólmur – Avian Flu at the Gannet colony

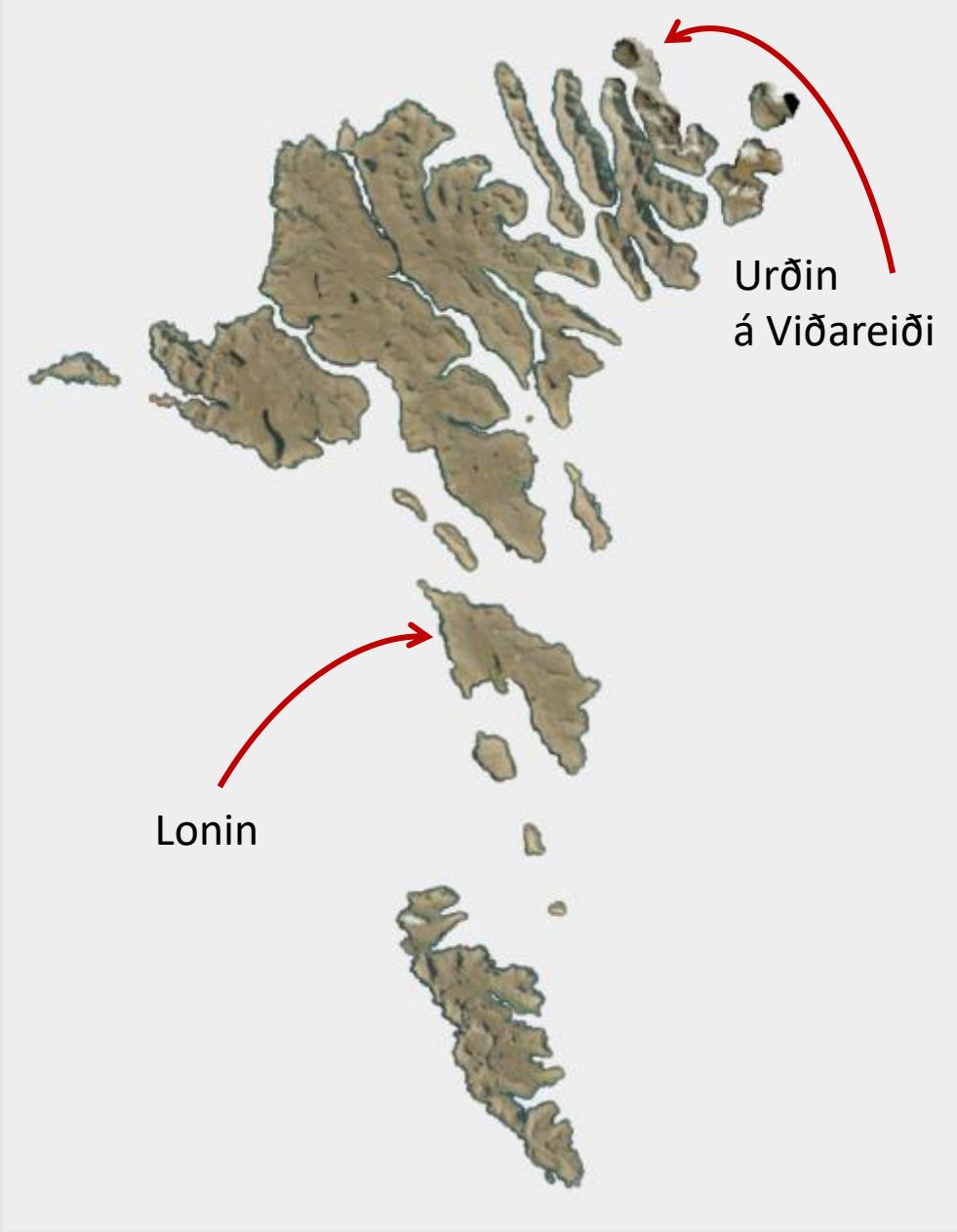
GPS tagging

Aim

- Investigating Home-ranges & feeding patterns during breeding season

Two sites

- Lonin & Urðin á Viðareiði



Urðin á Viðareiði

Geographically

- Facing Northeast

Lonin

Geographically

- Facing Southwest

Attachment of GPS-tags

- Center tail feathers
- Tape & glue
- 3.9 grams
- Solar panel
- Schedule for GPS-positions of 0.5-1 hour.

What have we learned?

- Home-ranges & feeding patterns during breeding

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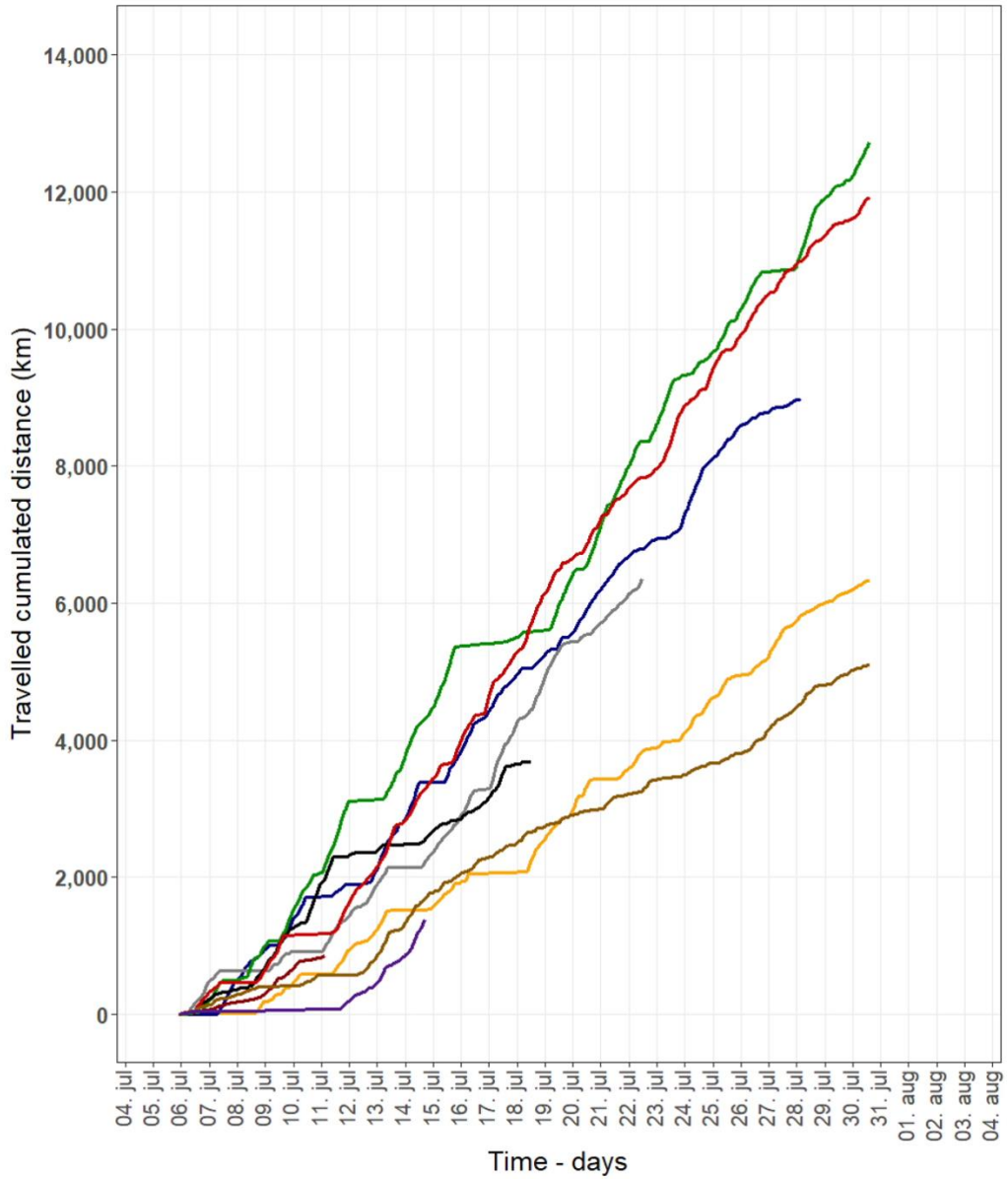
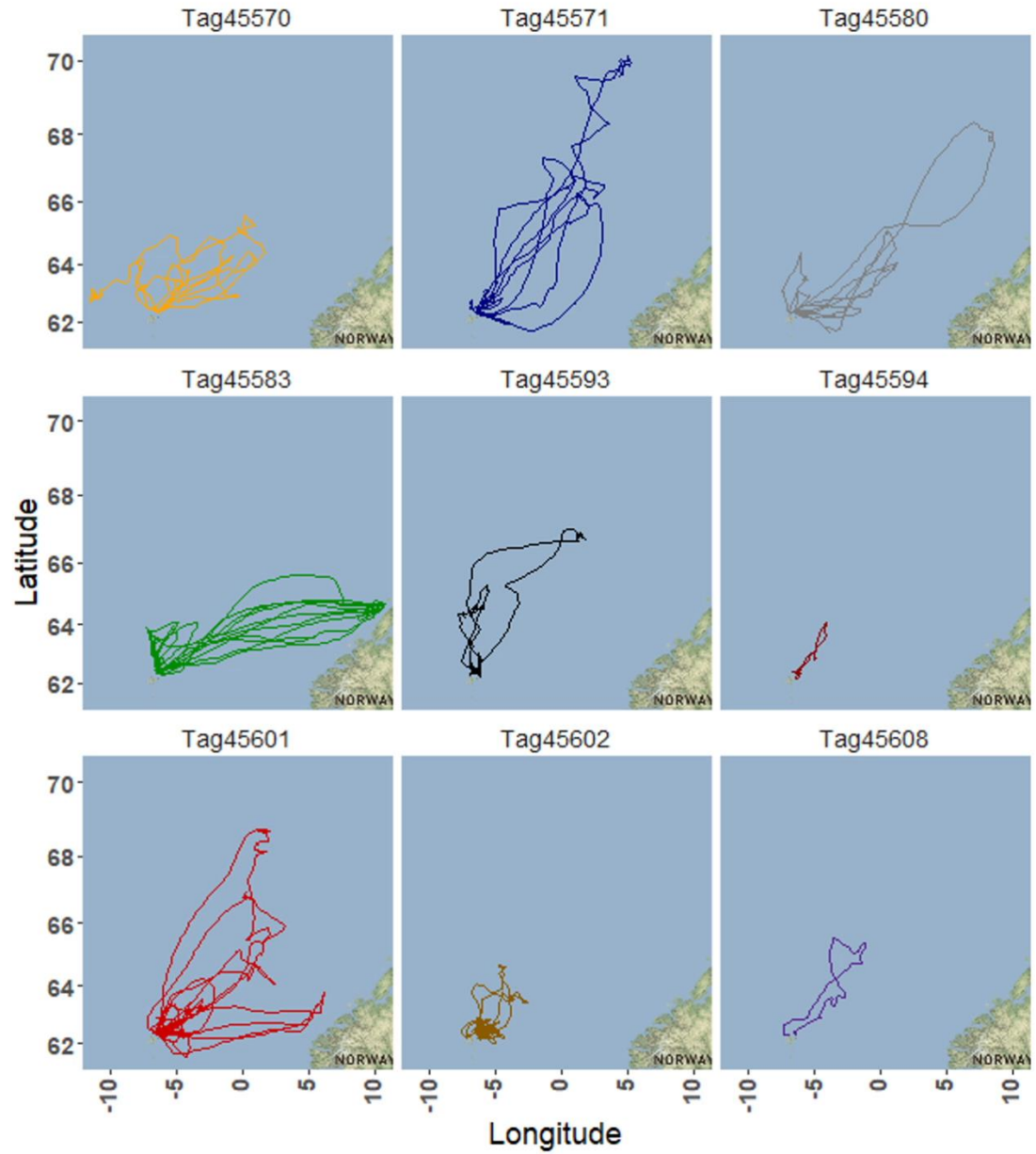
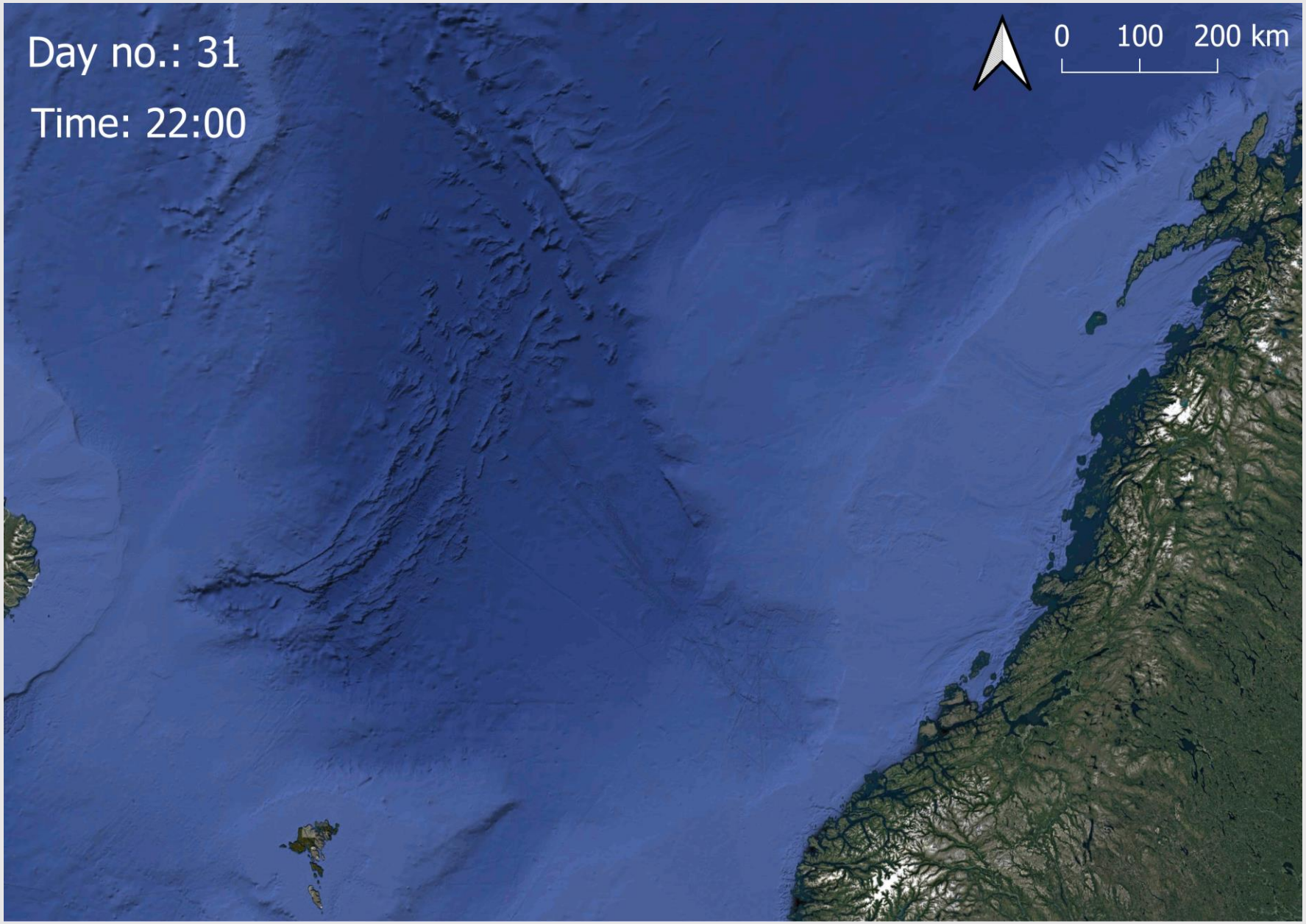




Movements

- Northeastern pattern for all individuals at this location
- Particular good feeding in Norway??
  - 6 trips in 1 month



Drone surveys

– *Gannets*

Drone surveys of seabirds

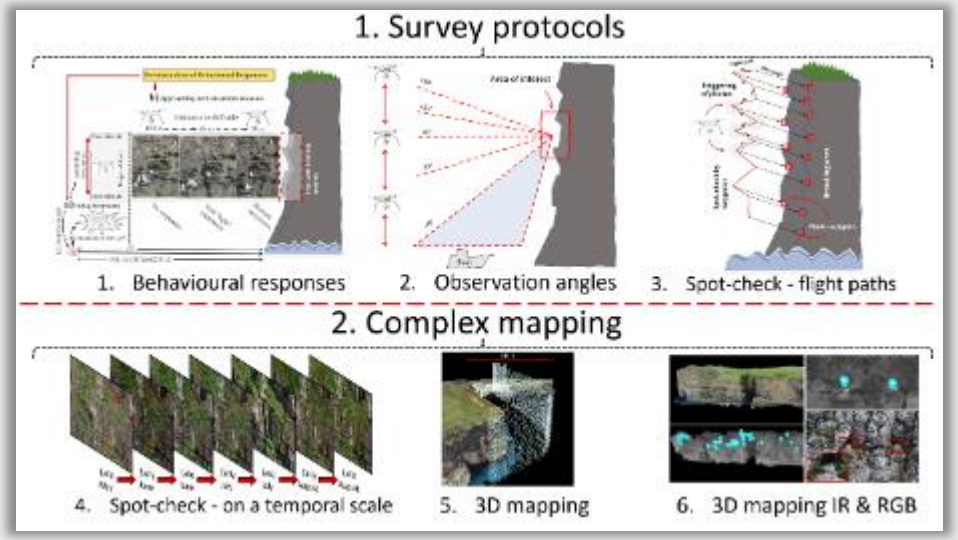
- Central part of my PhD project

Aims

1. Development of suitable flight protocols
2. Supplement to enhance data collection for key species

Promotions in the Faroes

- Protocol development – featuring with article in Frøði (12.2021)



UAV equipment

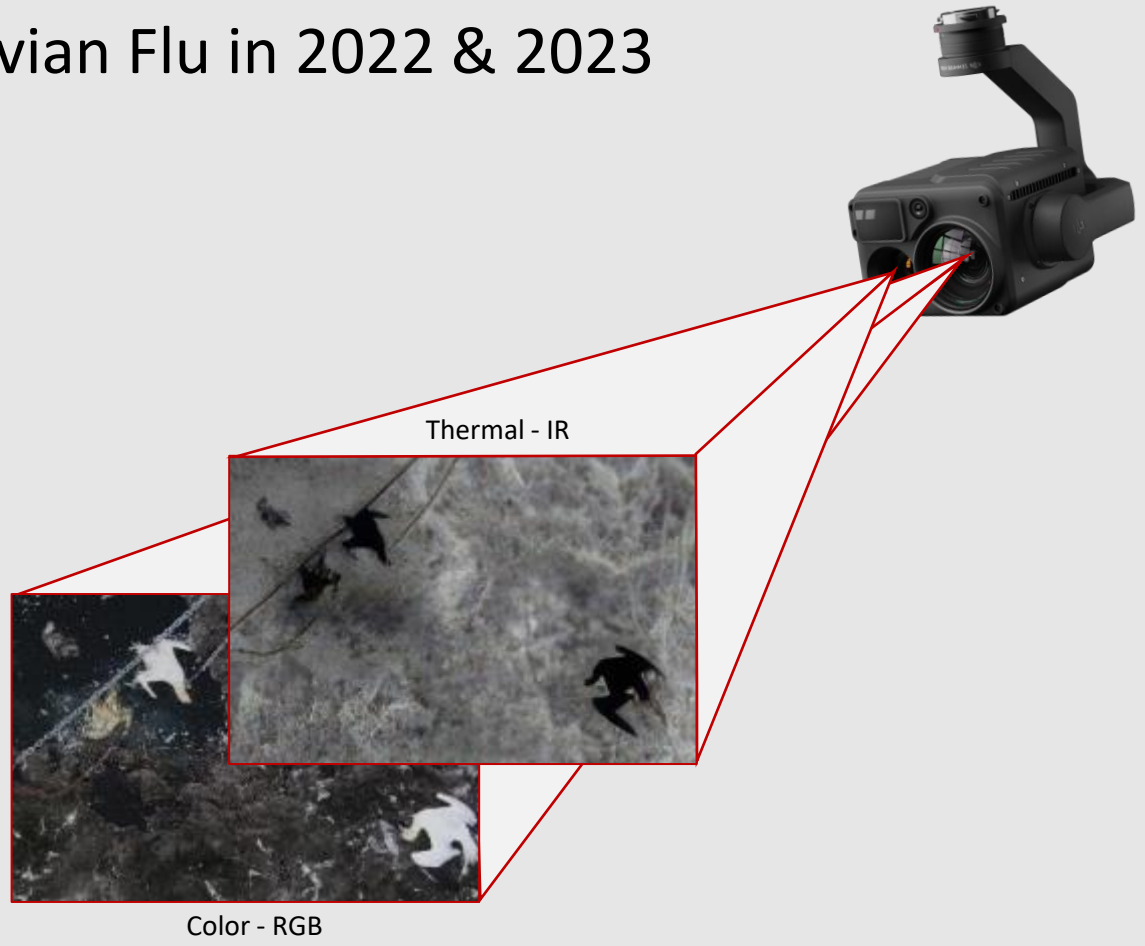
Case study – Dual sensor approach

Investigating the effect of outbreak of Avian Flu in 2022 & 2023

- Impacts on Northern Gannets
- A non-invasive method

Working paper / methodical study

- Optical – color sensor
- Thermal – radiometric sensor



Flight protocol / workflow

Distance to the cliff face of 35-60 m

Third week of July

- Both 2022 & 2023

Ensuring post 3D reconstruction

- Coverage enabled imagery from multiple angles

Results

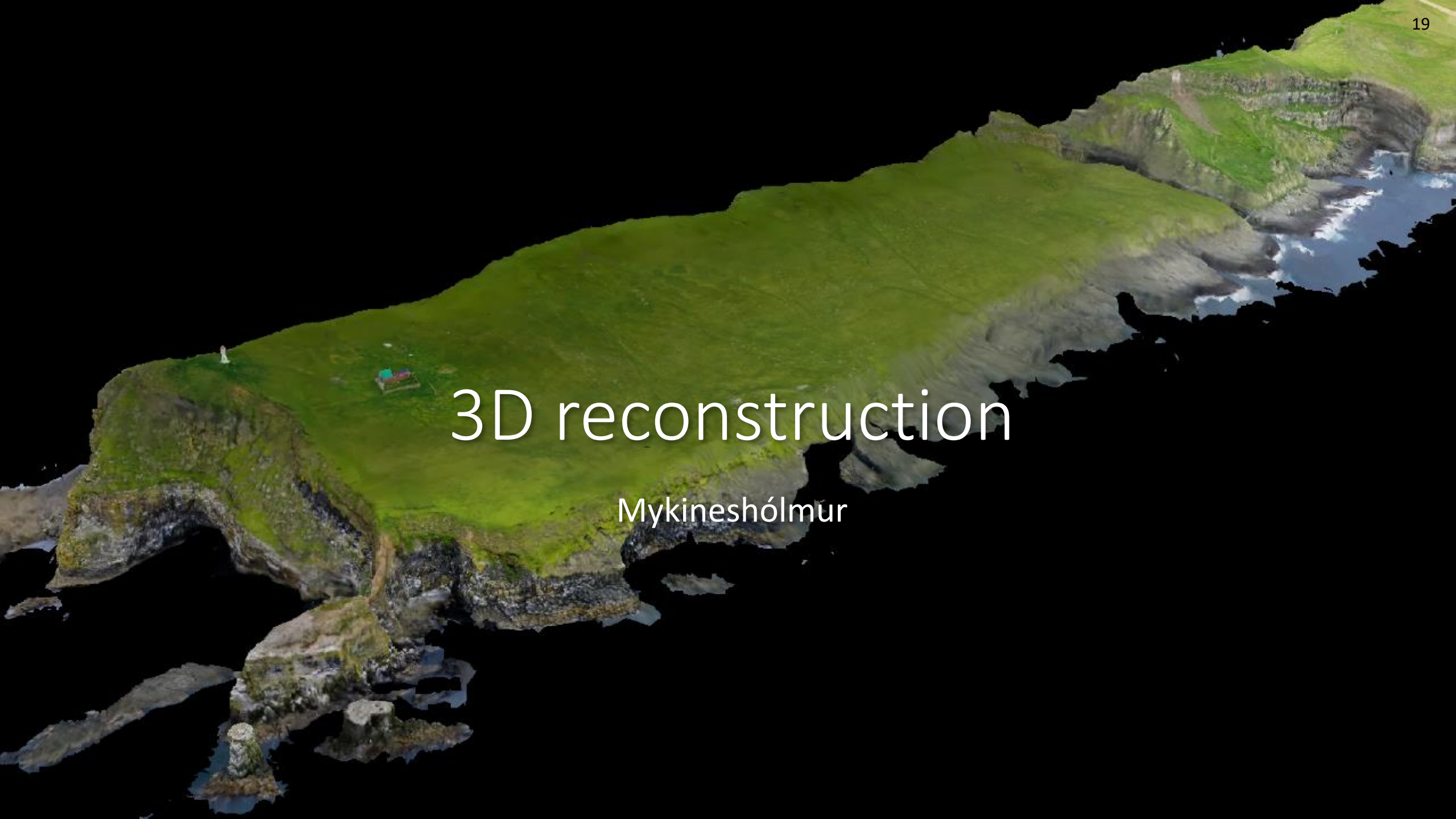
Detection of sick & dead individuals with thermal sensor

Comparison with RGB

Avian Flu

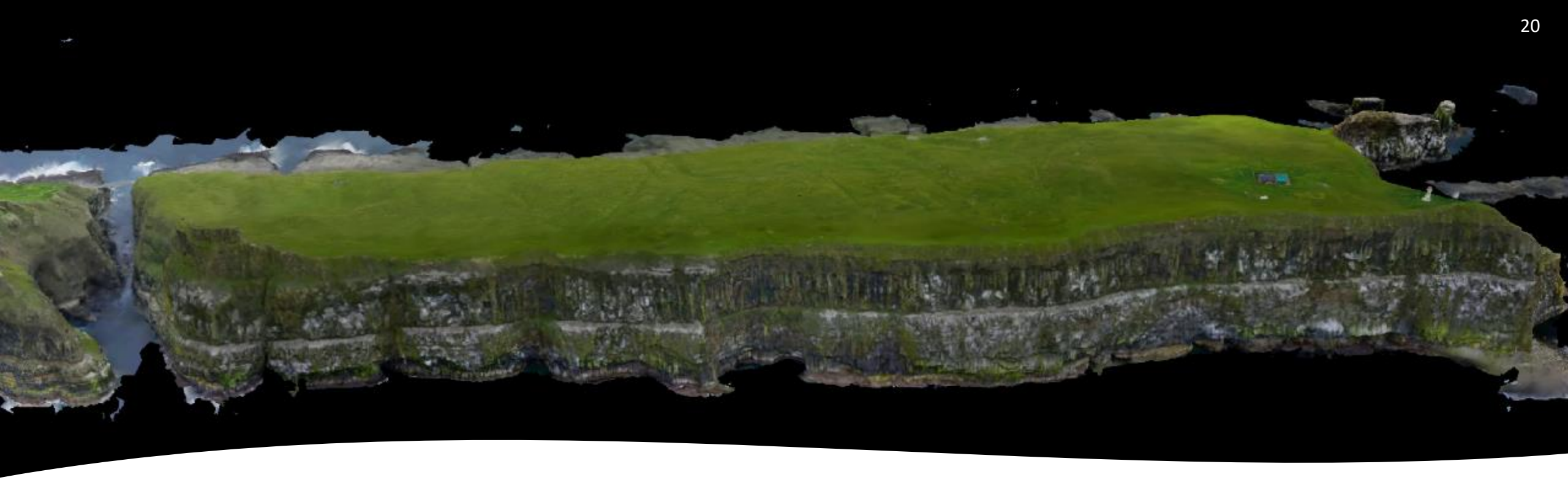
- Transmittance at close quarters
  - Dead families

Clustering of dead and sick birds



3D reconstruction

Mykineshólmur

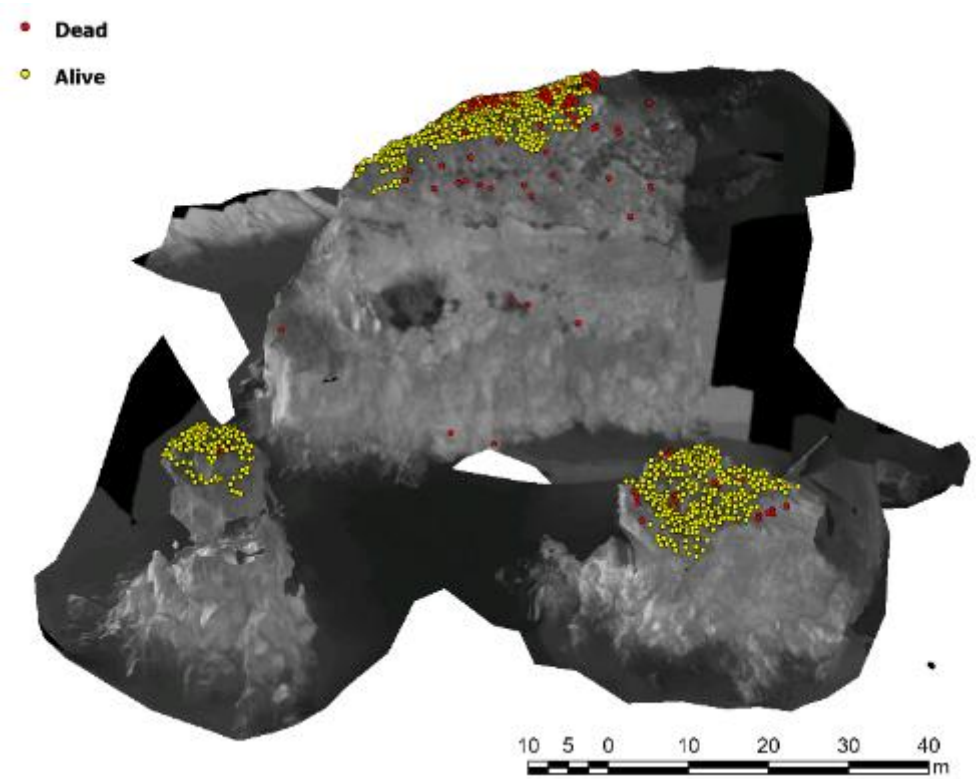


Reconstruction of 3D environment

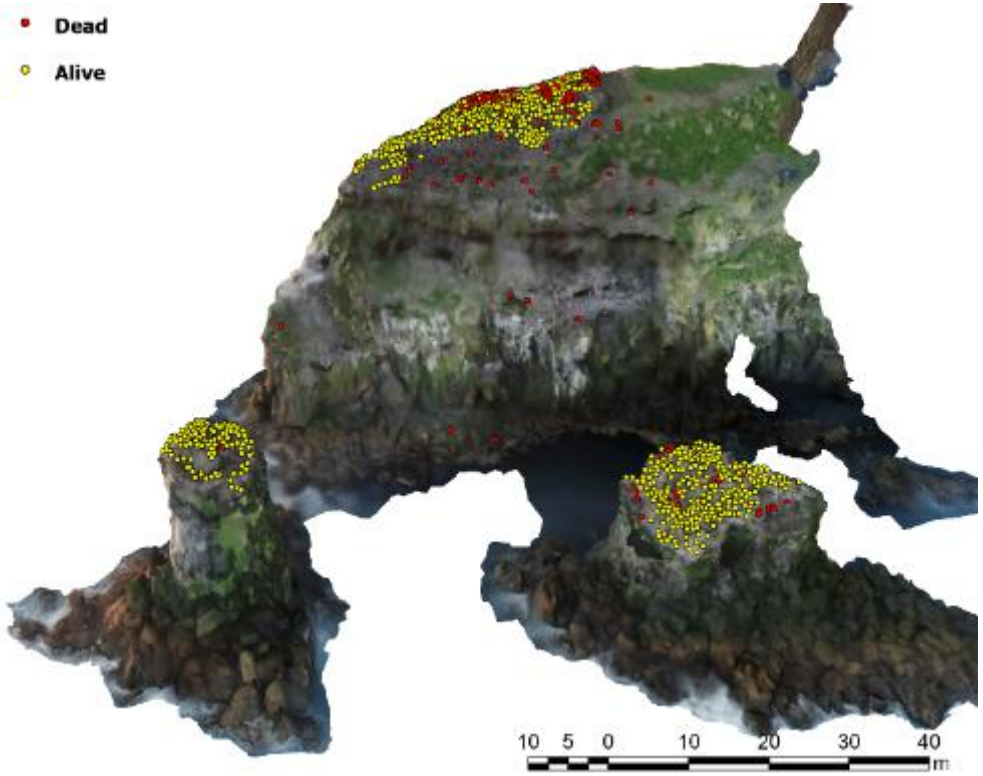
- Coverage of all areas with breeding Gannets
- Comparable between years/seasons

Use of multiple layered 3D data

- Identification of individual birds



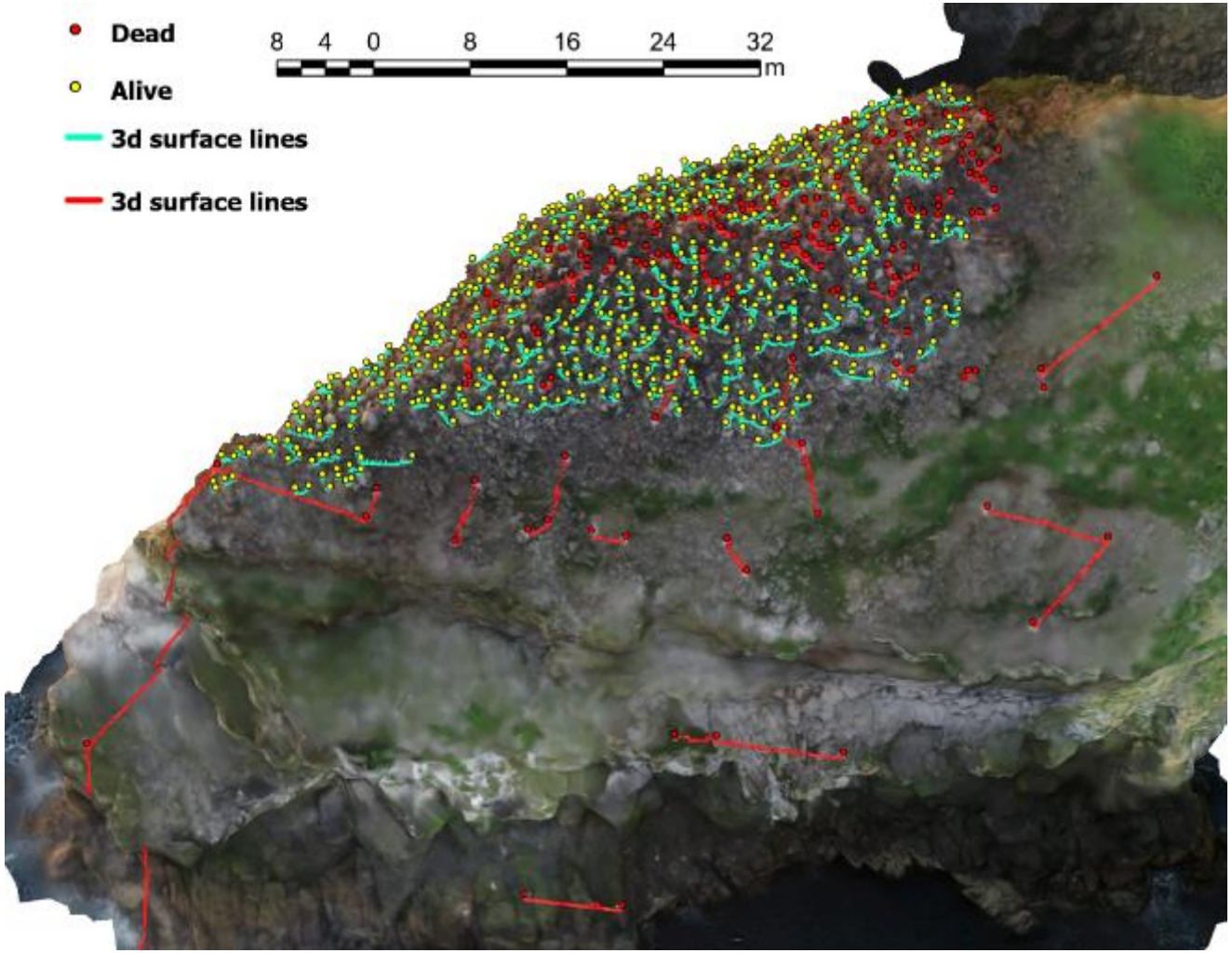
Thermal view



With color sensor

Measuring distances & densities

- Calculate distances over a 3D surface?
- Shortest distance relative relation between each ”pair” of birds in the colony



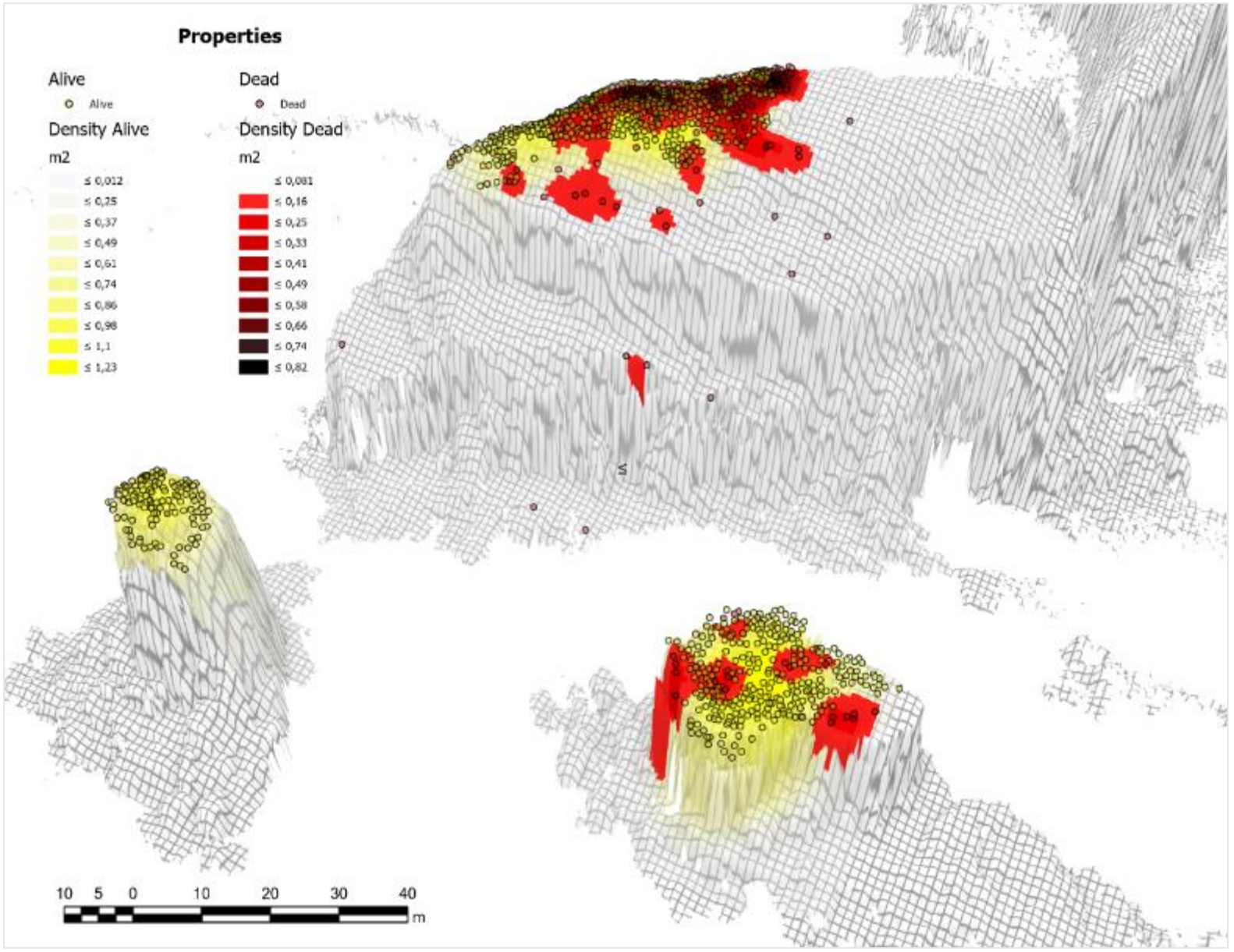
Density – *heatmaps*

Bird density 2022

Density of dead birds

- Clusters
- Dead individuals in many colony sections

Working on further analysis



Possible explanation → surveys 2022 & 2023

- Promising method (HPAI)
  - Detection and analysis of areas affected by dead or sick individuals.
- 3D models
  - Layered imagery of both IR and RGB 3D was successful
  - Reconstruction of the colony area
  - Characterized by steep cliff sides with complex and challenging topography.
- Transmittance of HPAI happens at close quarters?
  - At the colony, with highly clumped distribution of affected areas.
- **Immunity?**
  - No dead birds in 2023

Thank you for your time

Thanks for help:

– GPS-tagging

- Sjúrður í Koltri (Lonin)
- Tóri, Martin & Poul Johannes Simonsen (Viðareiði)

– Drone work – Mykines

- Esbern í Eyðanstovu