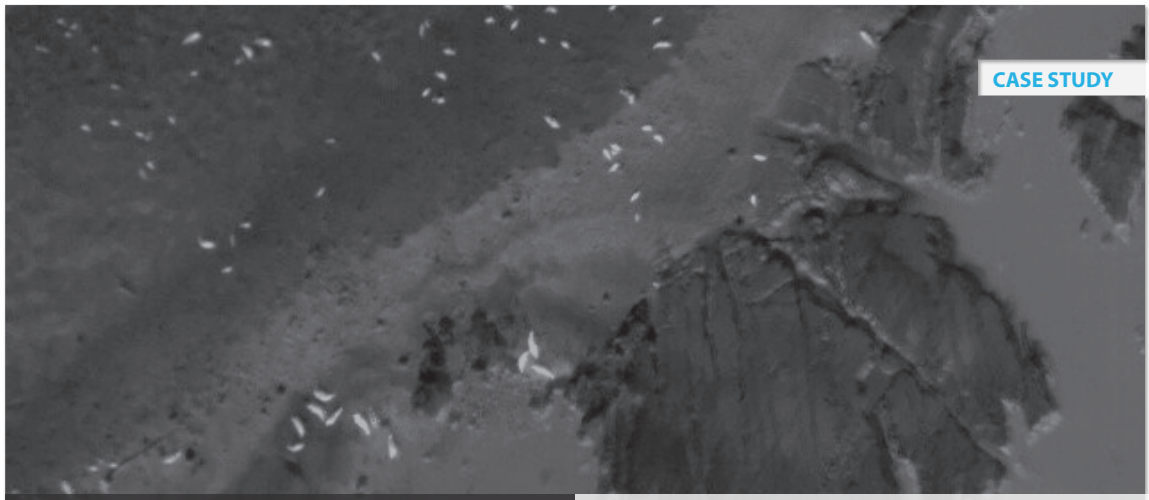


CASE STUDY

Cold Spot – Using a drone to count grey seals in Canada

When Duke University researchers wanted to try counting seals with a drone, they headed to Canada with two senseFly eBees and several different cameras. The project's results confirmed how UAV technology can help save time and money, highlighting in particular the promise of thermal imaging.

David Johnston is an Assistant Professor at Duke University's Nicholas School of the Environment and one of America's leading marine conservation experts. In 2015, one of his team's focus species was grey seals and their pups.

The seals return

A key starting point when assessing animal populations is knowing how many animals exist in a specific location at a specific time. However, with the frustrating tendency of living things to keep moving around, counting them isn't a simple task.

> "Traditionally such surveys would be carried out via plane or helicopter, often using handheld cameras"

"We wanted to use the eBee to improve how we work by generating orthomosaics [2D maps] of seal colonies from its high-resolution images," Johnston explains. "At the same time we also wanted to see what the eBee's thermoMAP camera could do. We suspected a thermal sensor could help with the problem of counting. Traditionally such surveys would be carried out via plane or helicopter, often using handheld cameras. This approach can be incredibly inefficient, plus it is very expensive to hire the aircraft and pilots."

As for why Johnston's department chose an eBee in the first place, he claims the system's integrated workflow was a big draw. "With the eBee we could start producing and using data quickly. This ease of use and quick deployment is a real advantage in our line of work." Johnston says.

Heading North

Johnston contacted Dr. Mike Hammill at Fisheries and Oceans Canada and requested permission to work at Saddle Island and Hay Island in Eastern Canada. Flights were booked for two of Duke's research technicians; Julian Dale and Susan Heaslip.

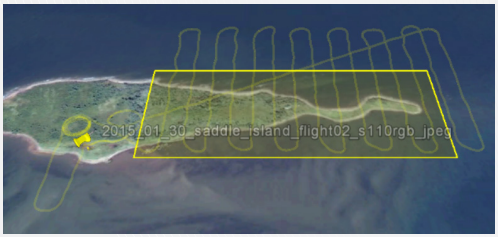
They headed North with two eBees and four camera payloads: two RGB cameras (the eBee's supplied IXUS/ELPH RGB sensor and its alternative S110 RGB); a S110 near-infrared (NIR) camera; and the eBee's new thermoMAP sensor.

UAV methodology

The team's first calculation was to identify landing spots. The eight flights then took two days. These were flown in temperatures of -20 °C (-4 °F) with winds of up to 20 knots or 23 mph (10.3 mps), with flight times of 20-30 minutes.

senseFly
a Parrot company

Using the drone's eMotion software, the team set the flights' required ground resolution to 2.5 cm per pixel for RGB and NIR flights (resulting in flight altitudes of 75 -95 metres), and 14 cm/pixel. These parameters meant the drone captured between 200 and 300 images per RGB and NIR flight, and between 4,000 and 7,000 per flight with the higher frequency thermoMAP.



The team's optimised flight plan, overlaid onto Google Earth. Short vertical flight lines were found to lead to better counts than longer horizontal lines.

These images were quality checked using the drone's Pix4Dmapper software before generating separate RGB, NIR and thermal orthomosaics. Johnston predicts the thermal imaging approach will bring a real time-saving benefit, in future. "Because the thermoMAP records temperatures, we can automate our counting by filtering results by heat, even counting the individuals laying in the bushes or under a tree."

Future fantastic

With the team's orthomosaics produced, and the eBee's reliability proven in another challenging location, Johnston's team returned from Canada enthused about the potential benefits of counting animals via UAV.

"I think we've established that using a UAS can be more efficient than taking shots manually from manned aircraft," Johnston states. "We could actually buy a full eBee system for what two aerial surveys would have cost us previously."

> "We could actually buy a full eBee system for what two aerial surveys would have cost us previously"

A section of the team's RGB orthomosaic of Saddle Island (the small elongated black shapes are seals).

PROJECT STATISTICS

5 flights

200 - 300 images per flight (RGB/NIR)

Orthomosaics: **RGB, NIR, thermal**

Temperature: **-20 °C (-4 °F)**

75 - 95 m flight altitudes

12,500 total images

3 cm / pixel avg. GSD (RGB/NIR)

<10.3 m/s wind speeds

4,000 – 7,000 images per flight (thermal)

15 cm / pixel avg. GSD (thermal)

Get the newsletter: www.sensefly.com

senseFly a Parrot company