

# Drones and artificial intelligence show promise for conservation of farmland bird nests

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Farmland bird species are declining over most of Europe. Birds breeding on the ground are particularly vulnerable because they are exposed to mechanical operations, like plowing and sowing, which take place in spring and often accidentally destroy nests.

## Locating nests on the ground is challenging for the human eye, and highly time-consuming

Researchers flew a [drone](#) carrying a thermal camera over [agricultural fields](#) to record images. These were then fed to an [artificial intelligence algorithm](#) capable of accurately identifying nests, a first step to aid their protection. Researchers tested the system in Southern Finland near University of Helsinki's Lammi Biological Station, using wild nests with eggs of the Lapwing *Vanellus vanellus*.

"We have been involved in conservation of ground-nesting farmland birds for years, and realized how difficult it is to locate nests on the ground. At least

at [high latitudes](#), the temperature of these nests is typically higher than that of the surrounding environment. Hence, we thought that thermal cameras could assist. A small pilot study indicated that thermal vision is hampered by vegetation and objects on the ground. Therefore to make this an efficient system, we thought that the camera could be flown using a drone, and [artificial intelligence](#) could help to analyze the resulting thermal images. We show that this works. However, the system performed best under cloudy and cold conditions, and on even grounds," says Andrea Santangeli, an Academy of Finland fellow at the Finnish Museum of Natural History Luomus, University of Helsinki.

## Drone technology becoming rapidly popular in conservation

It is possible to map in near [real-time](#) the spread of diseases on crops in [agricultural areas](#) using drones with various sensors. The latter is an integral part of precision agriculture, a new way of crop production that makes large use of drone technology to monitor crops and maximize production efficiency.

Studies like this one can help pave the way to integrate bird [nest](#) detection within the drone borne sensors used in precision agriculture, and automate a system for saving those nests.

"The conservation community must be ready to embrace technology and work across disciplines and sectors in order to seek efficient solutions. This is already happening, with drone technology becoming rapidly popular in conservation. A next and most challenging step will be to test our system in different environments and with different species. Our auspice is that this system will be, one day, fully integrated into agricultural practices, so that detecting and saving nests from mechanical

destruction will become a fully automated part of food production," says Andrea Santangeli.

**More information:** Andrea Santangeli et al, Integrating drone-borne thermal imaging with artificial intelligence to locate bird nests on agricultural land, *Scientific Reports* (2020). [DOI: 10.1038/s41598-020-67898-3](https://doi.org/10.1038/s41598-020-67898-3)

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