

# Greater opportunity for scientific research using unmanned aircraft

April 29 2015

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Unmanned aircraft are creating new opportunities for scientific research. A fixed wing airplane, for example, can be used to compile detailed 3D models of a specific area for research into erosion, or to map larger areas. An octocopter can help with research into precision farming, vegetation or forests, for example, and can be used to survey specific marine areas, such as coral reefs. Aerial research using these aircraft has

huge advantages (in terms of time and cost) over research carried out from the ground or via satellites.

Researchers from Wageningen University and Alterra were recently among the first research groups in the Netherlands to be given a company exemption for conducting research with these [unmanned aircraft](#) (known as Unmanned Aerial Vehicles or UAVs). This is recognition that the aviation authority (Human Environment and Transport Inspectorate) sees Wageningen UR as a professional aviation entity, including the training courses, systems and operational flight procedures.

The Unmanned Aerial Remote Sensing Facility (UARSF) at Wageningen UR has two octocopters and a fixed wing airplane at its disposal. They are used to carry out unmanned flights for various types of research in rural areas. The research facility is a collaboration between the Laboratory of Geo-information Science and Remote Sensing and the Soil Physics and Land Management Group of Wageningen University, and research institute Alterra. At present, there are nine qualified pilots. Alterra researcher Sander Múcher: "We use different recording systems depending on the purpose of the operational flight. The systems include multispectral, hyperspectral and thermal cameras. We have set up separate image processing chains for each camera system to process the images we record. We base our decision about whether to use a fixed wing or an octocopter on the goal of the flight concerned."

The Octocopters can carry 2 kg, which means that they can operate all kinds of camera systems. However, they can only map a maximum of 30 ha in any one day (5 ha per flight), whereas the fixed wing system can easily map 500 ha per day. The unmanned Wageningen aircraft have also been used internationally, including in countries such as Spain, Bonaire, French Guyana, Indonesia and Rwanda.

"The flexibility of our unmanned aircraft has given us the potential to use advanced cameras to make highly detailed analyses of water or nutrient supplies in crops," says Lammert Kooistra from Wageningen University. "Combining this with existing satellite systems allows farmers to optimise irrigation and fertilisation on their land, while also ensuring optimum timing. This will ultimately improve the crops themselves and the way scarce resources are used."

Provided by Wageningen University

Citation: Greater opportunity for scientific research using unmanned aircraft (2015, April 29) retrieved 11 May 2024 from <https://phys.org/news/2015-04-greater-opportunity-scientific-unmanned-aircraft.html>

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