

# Patented method transforms digital cameras for aerial color infrared photography

September 26 2011, By Don Comis

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ARS physical scientist Raymond Hunt and colleagues have patented a way to transform commercial digital cameras to produce color infrared aerial photos that can measure the extent of vegetative cover. Credit: Raymond Hunt, ARS.

The U.S. Department of Agriculture (USDA) and David Linden, a technical consultant currently serving as a chief scientist at Science Applications International Corporation (SAIC) in McLean, Va., have jointly patented technology that transforms commercial digital cameras to color infrared cameras for aerial photography.

Raymond Hunt, a physical scientist at the Agricultural Research Service (ARS) Hydrology and Remote Sensing Laboratory in Beltsville, Md., and Linden did this by choosing a 12-megapixel camera sold without an internal filter that blocks near-infrared (NIR) light. They then added a

custom-made lens filter to block red light and transmit NIR. ARS is USDA's principal intramural scientific research agency.

The patented method allows photographing with light in the NIR, green and blue bands, which are used to measure the "greenness" of vegetation and extent of crop canopy cover. There is no need for further processing, so the images are available immediately upon landing. The cameras are also lighter and more compact than the traditional larger format cameras used for aerial infrared photography.

Hunt and Dean Hively, a U.S. Geological Survey scientist stationed at Beltsville, have found the photographs useful for detecting the extent of farmland in the Chesapeake Bay Watershed that is protected from [soil erosion](#) by [winter wheat](#) and other winter [cover crops](#).

Hunt and Hively are seeking to increase the spatial resolution to identify plant species and to measure the amount of chlorophyll in a single leaf of a crop. The scientists use their cameras aboard both airplanes and small [Unmanned Aerial Vehicles](#) (UAVs). UAVs can fly as low as a few hundred feet. Currently, UAVs cannot be flown for commercial use. The U.S. [Federal Aviation Administration](#) is developing rules and regulations on UAVs for safe applications.

Chlorophyll in leaves may indicate the amount of nutrients in the soil, so aerial imagery may be a way to help farmers save money by applying fertilizers more efficiently, which also helps protect the Chesapeake Bay.

[Read more](#) about this research in the September 2011 issue of *Agricultural Research* magazine.

Hunt, Hively, Linden, and colleagues have published papers on this research in the [Agronomy Journal](#) and [Remote Sensing](#).

Provided by USDA Agricultural Research Service

Citation: Patented method transforms digital cameras for aerial color infrared photography (2011, September 26) retrieved 27 April 2024 from <https://phys.org/news/2011-09-patented-method-digital-cameras-aerial.html>

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