

Design of an Agricultural Runoff Monitoring and Incentive System for Maryland

Hoon Cheong, Willie Heart, Lisa Watkins, and Harry Yoo

Department of Systems Engineering and Operations Research
George Mason University
Fairfax, Virginia

Corresponding author's Email: hyoo9@gmu.edu

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Abstract: The Chesapeake Bay is currently polluted with excess nitrogen and phosphorus coming from agricultural runoff. To reduce agricultural runoff, systems must be introduced to monitor nutrient levels on farmland and incentivize farmers to adopt best management practices. This project uses the Upper Chesapeake Bay in Maryland as a case study. Results indicate that unmanned aerial vehicles (UAVs) with a multispectral imagery subsystem would offer the greatest balance of cost and utility for monitoring farmland. However, because legalizing commercial-use of UAVs is currently in process with the Federal Aviation Administration (FAA), it is recommended that a manned aircraft with a multispectral imagery subsystem be used to test a proof of concept with a category-based incentive system framework. If this proof of concept succeeds and UAVs are legalized for commercial-use, move to a UAV platform for sustained monitoring operations.

Keywords: Agricultural Runoff, Monitoring System, Spectral Imaging, Incentives