

N.C. A&T Uses Drones to Bring “Smart Agriculture” to the Aggie Farm

Greensboro, NC – October, 2018 – A team of N.C. A&T researchers led by Dr. Ali Karimodini received a three-year, \$600K grant from the National Science Foundation to fly a team of drones above the university’s 492-acre farm, located off McConnell Road on the east side of Greensboro, for crop health monitoring, a revolutionary step toward smart agriculture.



N.C. A&T’s University Farm is a working, producing farm that raises crops and livestock. Students and faculty in the College of Agriculture and Environmental Sciences use the farm for research and education, while the Cooperative Extension uses the farm to test and demonstrate new crops and farming practices before introducing them to North Carolina’s farming community. The objective of Dr. Karimodini and his team is to develop a distributed airborne monitoring system to detect possible

zones of crop damage or nutrient deficiency at this farm, and eventually many others. Unlike traditional crop management methods that use farmers or ground vehicles for assessing crop health status, using autonomous technology to perform aerial monitoring of agricultural fields saves time and money, while preventing damage to crops.

A multi-disciplinary team of three N.C. A&T faculty members representing three university Colleges are supporting this research grant. Dr. Karimodini in the College of Engineering is the project principal investigator and director of the Autonomous Cooperative Control of Emergent Systems of Systems (ACCESS) Laboratory with a focus on cooperative control of systems of autonomous vehicles. Dr. Leila Hashemi-Beni from the College of Science and Technology is

the Director of the Remote Sensing and Geospatial Science Research Laboratory with a focus on data processing of remote sensing data from unmanned autonomous vehicles, as well as airborne and satellite imagery for precision agriculture and environment management. Dr. Abolghasem Shahbazi in the College of Agriculture and Environmental Sciences is director of the CREST Bioenergy Center. In this project, he will use the remote sensing data to evaluate the crop and biomass yield produced at N.C. A&T farm.



(L-R) Drs. Karimoddini from the College of Engineering, Hashemi-Beni from the College of Science and Technology, and Shahbazi from the College of Agriculture and Environmental Sciences will conduct this multi-disciplinary project on technological developments for smart agriculture using a fixed-wing drone such as the one shown here.

“In order to accommodate rapidly-growing food demands and increase the quality and quantity of agricultural production, it is necessary to improve farming management practices and technological developments in agricultural fields,” explains Karimoddini. “This project will blend our university’s expertise in control, robotics, remote sensing and agricultural engineering to develop new approaches for automated monitoring of smart agricultural systems.”

This NSF award supports fundamental research to develop innovative techniques for smart agricultural systems by employing a distributed airborne networked sensor system for a team of Unmanned Aerial Vehicles (UAVs) to survey a farm; what is learned here east of Greensboro can benefit farms across the entire state and beyond.

Integrated with the proposed research is an innovative education and outreach plan that will engage a diverse range of students, farmers, and local community members in STEM-relevant activities aimed at increasing public awareness on the new technologies which can be brought to bear on furthering the development of precision agriculture.