

Vermont Association of Conservation Districts (VACD) – FY 2021 VT NRCS CIG Proposal

Utilizing UAV Technology

The Vermont Association of Conservation Districts (VACD) Small Unmanned Aerial Systems (sUAS) Program aims to support and assist in the reduce agricultural non-point source pollution, improve soil health and support farm viability by using Unmanned Aerial Vehicles (UAV), or drone technology to expedite conservation planning processes. UAV technology is multipurpose and can accommodate many project types to aid in real-time data delivery to stakeholders. VACD has been using this innovative technology since April 2020 to acquire up-to-date aerial imagery and elevation data to aid in conservation planning and design.

The VACD initial pilot sUAS program is nearing the completion of seven beta flights located in Addison, Chittenden, Franklin, and Grand Isle counties in Vermont. Flying a Phantom 4 Pro V2.0, pilots have learned that their current quadcopter UAV is productive and efficient for elevation and imagery data collection for small scale projects of 50 acres or less. The quadcopter style UAV works well for farmstead engineering surveys when combined with Ground Control Points, which for larger survey areas can require a significant time investment. Due to the size and style of drone currently employed by the program, wind speed, field size, battery life, and camera/sensors quality are all limiting factors.

VACD is seeking a Conservation Innovation Grant to expand the sUAS program through the acquisition of a Real-Time Kinematic (RTK) or Post-Processed Kinematic (PPK) enabled, fixed wing drone. A fixed wing UAV can fly over 300-500 acres on a single battery and can fly in more varied weather conditions , meaning data capture could occur for longer periods in more variable conditions. RTK/PPK would eliminate the need for GCPs (Ground Control Points) onsite, allowing pilots to capture highly accurate data on larger areas with minimal upfront labor costs. Additionally, some fixed wing models allow for camera/sensor interchangeability, such as a multispectral or thermal imaging. Expanding this program beyond a single drone would diversify potential project types and better bolster pilot skills.

The VACD sUAS Program aligns with the goals of the Conservation Innovation Grant by tailoring priority projects to areas for water quality benefits, including looking at wetland restoration volumetrics, sediment transport from eroding streambanks, farmstead designs for manure management, among others. In just a year, this program has begun to offer staff and customers alike a unique perspective of the land and has allowed Vermont-NRCS to be a front runner in technological innovations that interface well with NRCS's mobile tools, Conservation Desktop and other emerging technologies.

VACD will fly twelve projects throughout Vermont to determine and demonstrate the value of using UAV technology in all phases of the conservation planning process, with a variety of land uses, production types and conservation practices. We will share lessons learned in using this technology with NRCS, VACD and NRCD staff, other technical service providers, and agricultural producers through a diversity of online and in-person presentations, as well as field demonstrations. We will also share information with Conservation Districts that may be interested in development their own UAV programs. In addition, we will share lessons learned at several national conferences in order to expand the benefits of this technology more widely.