

## **A Comparative Analysis of Data Sets Using sUAS, Terrestrial LiDAR, and Conventional Topographic Survey Methodologies**

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Use of small Unmanned Aircraft Systems (sUAS) has steadily risen in the past few years and has found its place as an invaluable tool in many industries. The purpose of this study is to evaluate the suitability of UAS as a surveying and inspection tool. The focus will mainly center on the comparison of photogrammetric sUAS data collection and quality control versus conventional surveying techniques and equipment such as Electronic Distance Measurement (EDM), Real Time Kinematic GPS (RTK), and stationary and mobile terrestrial laser scanning.

Common survey project types encountered by the U.S. Army Corps of Engineers where sUAS may provide greater efficiency over conventional methods include: levee settlement calculation, design/build volume calculations, topographic feature identification, hard feature deformation detection, and damage assessment surveys such as levee slides and storm damage identification.

The study will be performed by conducting both conventional and sUAS surveys of common areas to compare both efficiency and relative accuracy. sUAS equipment to be evaluated will include the *senseFly* eBee and Albris airframes. Conventional EDM and RTK data collection will be performed using *Trimble* total station and GPS platforms. Stationary terrestrial LiDAR data will be collected using a *Trimble* total station with scanning capability. Mobile terrestrial LiDAR will be collected using an integrated system of a *Velodyne* three-dimensional LiDAR scanner and an *Applanix* Inertial Navigation System (INS). Finally, all data will be processed using appropriate software and concluding comparisons between the various survey methods will be performed using GIS.