UNIVERSITY TRANSPORTATION CENTER

RESEARCH BRIEF

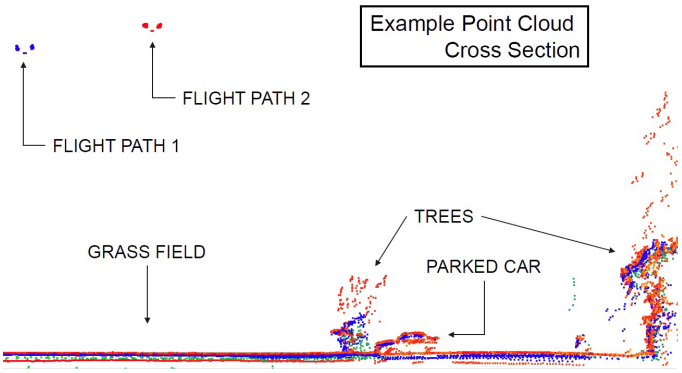
PROJECT TITLE: **An Airborne Lidar Scanning and Deep Learning System for Real-Time Event Extraction Control Policies in Urban Transportation Networks**

PRINCIPAL INVESTIGATOR: Chris Parrish (OSU), Sameh Sorour (UI), Ahmed Abdel-Rahim (UI), David Hurwitz

INSTITUTION: MULTI-INSTITUTION PROJECT
ESTIMATED COMPLETION DATE: AUGUST 2019
SPONSORS: THE PACIFIC NORTHWEST TRANSPORTATION CONSORTIUM, OSU, UI

Background

This project investigates two potentially game-changing technologies with the capability to transform the way in which transportation agencies plan, design, construct, monitor and maintain their transportation networks: 1) unmanned aircraft systems (UAS), also known as "drones," and 2) light detection and ranging (lidar). By applying new deep learning algorithms to multi-temporal, 3D point clouds generated from UAS lidar, it may be possible to rapidly extract features of interest to aid in decisions concerning: emergency response, clearance, congestion, accidents, fire, and parking utilization, as well as a range of multimodal transportation activities. The project combines Oregon State University's research expertise in UAS and lidar with University of Idaho's expertise in deep learning for the purpose of extracting decision-relevant information from large data sets in near real time.



Research Project

The project team is currently investigating the capability to provide transportation and mobility solutions driven by real-time data generated from UAS using lidar and event identification through deep learning. Specific project tasks include: 1) developing optimal UAS-based lidar acquisition methodologies (payloads, sensor settings, and processing strategies) for transportation network scanning; 2) designing, implementing, and testing a deep learning algorithm that can extract features from the UAS lidar data, and 3) developing guidelines for state DOTs and other transportation agencies on the technical and operational requirements for UAS-based lidar data integration. The OSU project team recently integrated a Velodyne Puck lidar system and OxTS xNAV direct-georeferencing system on a DJI S1000 remote aircraft and have conducted test flights under an FAA-issued Certificate of Authorization (COA). Next steps will include working with ODOT to identify project sites to scan with the UAS-based lidar and transmitting the data to the UI project partners for implementing and testing the deep learning algorithms.