The processed returns, which number in the billions for a typical LiDAR survey, represent the ground surface and reflect back to the LiDAR sensor (Fig. 1). The reflected laser pulse continues downward and reflects from the target, such as the ground surface or vegetation, back to the sensor. Each return represents an actual ground location and is stored in a database that is then used to create a digital surface model (DSM) of the ground surface.

A portion of the processed returns represent the ground surface and are extracted using automated filtering methods to produce a digital terrain model (DTM) of the bare earth. This DTM is created by removing the aboveground features, such as trees and buildings, from the DSM. The bare-earth DTM is then used to create a digital elevation model (DEM) by calculating the elevation at each point in the DTM.

The LiDAR data acquired in Jo Daviess County is used to create a detailed LiDAR surface topography map of the county. This map is created by overlaying the LiDAR data with other geospatial data, such as road and river networks, to create a comprehensive view of the landscape. The LiDAR data is also used to create a digital elevation model (DEM) of the county, which is used to identify areas of interest, such as sinkholes and areas of steep slope.

The LiDAR data is acquired using airborne laser sensors that emit light pulses in the near-infrared part of the electromagnetic spectrum. These light pulses are detected by instruments that record the time it takes for the light to travel from the sensor to the target and back. This time is used to calculate the distance to the target, which is then used to create the LiDAR point cloud.

For permission information, contact the Illinois State Geological Survey.