1137-86-353 **Demetrios Gatziolis*** (dgatziolis@fs.fed.us), 620 SW Main Street, Suite 400, Portland, OR 97205, and **Robert J McGaughey** (bmcgaughey@fs.fed.us), University of Washington PO Box 352100, Seattle, WA 98195. *Point cloud-derived LiDAR platform trajectory over forested landscapes.*

The precise location and directional vectors of Light Detection and Ranging (LiDAR) instruments onboard airborne platforms are recorded in high frequency and are a prerequisite for generating spatially consistent point clouds. Unfortunately instrument trajectory data are often excluded from acquisition deliverables. The omission precludes certain types of LiDAR data analyses, including the estimation of forest canopy cover and normalization of LiDAR intensity. We developed a novel approach that estimates the trajectory of the LiDAR instrument exclusively from the point cloud. We calculate the closest point of approach in 3D space of multi-return LiDAR pulses and then fit a cubic spline through those points. Method evaluation in several biomes and physiographic conditions against recorded trajectories show good fit over forests with 3D RMSE lower than 1m. Over sparse and short vegetation the fit is substantially worse (RMSE $>$ 10m). The magnitude of error over forests is practically negligible for LiDAR data analyses dependent on instrument trajectory data. (Received February 06, 2018)