New Generation Sensors and Applications – LiDAR

**Effects of the incidence angle and surface type on the LiDAR intensity value**

Yu-Tien Wu\*, Chi-Kuei Wang

jensh920425@hotmail.com, chikuei@mail.ncku.edu.tw

Department of Geomatics, National Cheng Kung University

**Abstract**: LiDAR (Light Detection and Ranging) system is an active system, it measures distance by emitting a laser beam to the land cover and receive the reflected signal. The incident angle of the laser beam and the surface type affect the received signal, in addition to the range and atmospheric effects. Recent studies have utilized the intensity information of airborne LiDAR data for classification. However, such information has not been fully exploited as these studies used only single flight line. Typical airborne LiDAR data consists multiple flight lines with varying overlaps (~ 40% - 60%), which means a significant portion of the ground objects are likely to be measured from two different viewing aspects (each from the adjacent flight lines, respectively). The intensity measurements obtained from different viewing aspects imply the possibility of exploiting the bi-directional reflectance distribution function (BRDF) property of the ground surface for classification. In this study, we investigated the effects of the incident angle and surface type on intensity data, which were obtained from a Leica ALS70 airborne laser scanner with 60% overlap.

\*: Proposed presenter

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