

CROWN: Compression in Real-time Of Waveform Networks – A Robust LiDAR Compression Technology: From Sensing to Information Extraction

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The goal of this research is to develop a comprehensive and robust compression technology for airborne LiDAR data that preserves the information context of the full LiDAR waveform, and thus, can effectively support classification and, in general, feature extraction processes. A three-level approach is proposed to optimize the data amount with respect to the geospatial information content and the application objectives throughout sensing, recording, primary data processing, and final product formation. The proposed concept is based on combining both theoretical advances in Compressive Sensing or Compressed Sensing and wavelet-based compression, and the implementation characteristics of the state-of-the-art LiDAR systems to achieve optimal data reduction while preserving the geospatial information content of LiDAR data. The LiDAR system model, with the main data entities, which forms the basis for the three-level LiDAR data compression concept, is illustrated in the figure below. The proposed approach considers the problem in a broader sense, reflecting the entire LiDAR acquisition process that includes the data flow from the sensor level to the distribution phase.

