Generating Contours from LiDAR Data

Marvin H. Treu
University of Nebraska - Omaha
Objective

- Identify the procedures required to produce two-foot interval contours across Sarpy County, Nebraska
- The final product is planned as a submission to the ESRI Community Maps Program
Data

- Acquired by Nebraska Iowa Regional Orthophotography Consortium (NI ROC)
- Purpose: provide highly accurate high-resolution data for planning, design, research
- Collected by Merrick & Co. – April 2010
  - GSD: 1.36 meters (4.46 feet)
  - RMSEz: meet/exceed 0.3 feet
Methods

- ArcGIS 10 - 3D Analyst Surface Contour Tool processing a geodatabase terrain
- Merrick Advanced Remote Sensing (MARS) processing of LAS binary file format LiDAR point data
- ArcGIS 10 processing of Merrick-generated Digital Terrain Model (DTM) tiles using ESRI Contour Harvester python script
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Line measurement (Planar)
Segment: 2.383867 Feet
Length: 2.383867 Feet
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Results – ArcGIS/Geo-DB Terrain

► Produces contours with sharp bends; Lines not bound by breaklines which contributes to frequent anomalies

► Point File Information Tool
  ▪ Valuable statistical information about the LiDAR data field
  ▪ Useful for quality control

► Quickest method of the three for contour generation
Results – MARS/LiDAR LAS points

- Smoother contours (than method 1)
- Respects breakline boundaries
- Can adjust many parameters (amount of smoothing, min. contour length)
- Can edit point cloud (maintain original files)
- Edge-tying of contours required in post-processing
- Computer processor intensive; Can be labor intensive
- Can be time consuming, but provides excellent results
Results - ArcGIS/LiDAR DTM tiles

- Produces cartographically pleasing contours, but at the expense of some accuracy
- Edge-tying of contours required
- Contours respect breaklines built-in to DTM tiles
- Contour script takes hours to run, but produces excellent results
Conclusions

► Contouring a geodatabase terrain? → Perform a terrain-to-raster conversion before contouring

► Contouring a large area?  Want cartographically pleasing contours? → Use ESRI’s Contour Harvester script

► Engineering precision required? → Use Merrick’s MARS software

Note: Based on preliminary, qualitative analysis on a single dataset
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