

An Investigation of LiDAR Data Processing in Kalimantan

Leo B. Grafil, Philippines

Master thesis WS 2008/09

Supervisors: Prof. Dr. Michael Hahn

Dr. Viktor Böhm and Jürgen Frank, Kalteng Consultants



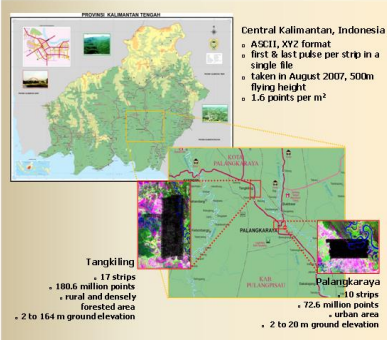
HOCHSCHULE FÜR UNIVERSITY OF
TECHNIK STUTTGART APPLIED SCIENCES

Master Course Photogrammetry and Geoinformatics

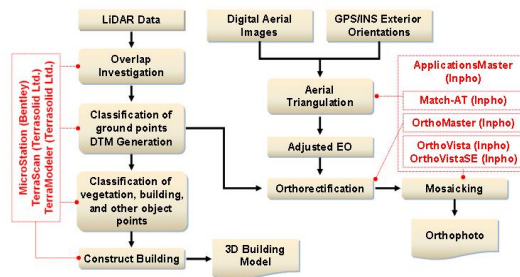
Objectives

- Investigation of overlapping strips: height and planimetric offsets?
- Filtering and classification of LiDAR points into ground, vegetation, building and other classes.
- Generation of orthophoto mosaic from the aerial images taken simultaneously with laser data.
- Feasibility of 3D building modeling with the data.

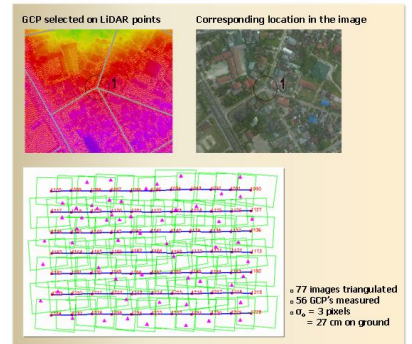
Study area and LiDAR datasets



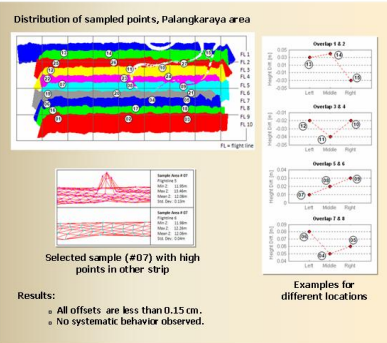
Workflow overview and software used



Aerial triangulation



Height offset



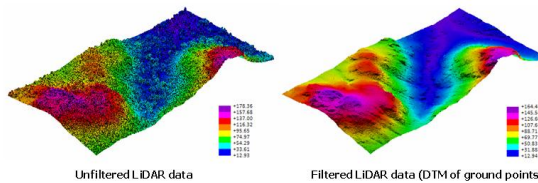
Filtering and classification

Class Number	Class	Description	Count	
			Palangkaraya	Tangkiling
1	Default	Unfiltered / unclassified points	0	0
2	Ground	Ground points	13,438,533	20,879,938
3	Low vegetation	Objects < 0.2 m above ground	11,786,732	26,077,295
4	Medium vegetation	Objects 0.2 - 2.0 m above ground	12,787,174	42,583,353
5	High vegetation	Objects > 2 m above ground	21,910,767	83,999,301
6	Building	Building roof points	10,887,431	1,144,240
7	Low point	Outlier / bad points	7,541	2,393
8	Model key point	Key points for ground model	1,788,032	3,937,442
9	Bridge	Bridge points	27,512	0
10	Tower	Tower points	2,662	4,057
11	High point	Outlier / bad points	64	132
Total			72,636,430	180,626,151

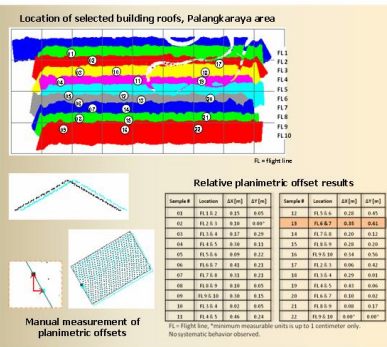
Orthophoto generation



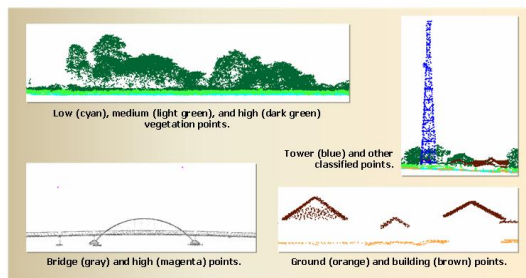
Shaded surface of Tangkiling area



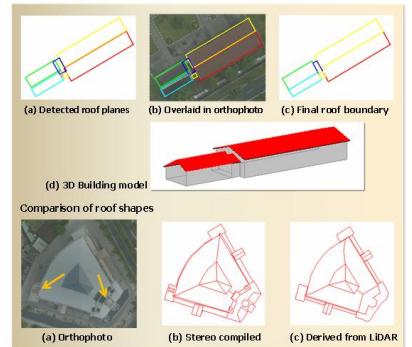
Planimetric offset



Point classification results:



3D Building modeling



Conclusions

- Successful filtering/classification of terrain points, vegetation, buildings and other objects with TerraScan.
- Ground and vegetation points automatically classified; building classification requires manual reclassifications; objects like bridges, towers are classified manually.
- Orthophotos generated; AT uses ground control points extracted from LiDAR data.
- 3D building models can be created semi-automatically, well defined boundaries for automatic boundary detection required.

Acknowledgement

The author acknowledges Kalteng Consultants for providing the LiDAR data and aerial images used in this thesis.