

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	<b>Linear Feature Extraction from Mobile Laser Scanning</b>
<b>Author's name:</b>	<b>Bc. Tadeáš Bartoš</b>
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Transportation Sciences (FTS)
<b>Department:</b>	<b>Department of Forensic Experts in Transportation</b>
<b>Thesis reviewer:</b>	Prof. Dr. Ing. Karel Pavelka
<b>Reviewer's department:</b>	CTU in Prague, FCE, dept. of Geomatics

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b> <i>How demanding was the assigned project?</i>	<b>challenging</b>
The work is timely and was certainly time consuming. It contains 80 pages including appendices and deals with the extraction of partial primitives from point clouds obtained by mobile laser scanning.	

<b>Fulfilment of assignment</b> <i>How well does the thesis fulfill the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	<b>fulfilled</b>
The thesis fulfilled its objectives. These are described in chapter 1.1 on pages 8-9.	

<b>Methodology</b> <i>Comment on the correctness of the approach and/or the solution methods.</i>	<b>correct</b>
The thesis could have a better chapter layout: Aims of the thesis, Introduction (including literature search), Materials and methods, Measurement, Data processing, Results and Conclusion. The information is a bit mixed here (e.g. description of the MMS system or literature search in paragraph 4).	

<b>Technical level</b> <i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	<b>C - good.</b>
The text is of interest to experts, performing an analysis of software outputs in terms of extracting partial primitives from a point cloud and showing a reduction in human work. The text should be better divided into logical parts (see methodology)	

<b>Formal and language level, scope of thesis</b> <i>Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?</i>	<b>B - very good.</b>
General note (typographic): - language – it is written in English, very good in my opinion, but I am not qualified to evaluate English - figures should be numbered in ascending order and not by chapter - data acquisition. [2–3] etc. The dot should be after the parenthesis - some figures are in low quality (fig. 3.5)	

<b>Selection of sources, citation correctness</b> <i>Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?</i>	<b>C - good.</b>
For citations there is a reference by brackets, but also by name, these are two different citation styles, but it is not advisable to combine them (page 26 ... a few exceptions. [19] The connected articles can be divided into two categories based on whether it focuses on the extraction of road edges or pole-like features. The first source discussed is the work of McElhinney et al. (2010).	

## Additional commentary and evaluation (optional)

*Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.*

Notes on the text (do not degrade their own work, but give suggestions for improvement):

Page 11, fig.2.1 - here you refer to systems used by drones; however, this is only a small part of ALS - the technology is mainly used by conventional aerial technology and is now commonly used in nationwide mapping (see Czech Republic 2009-2013, aerial laser scanning of the Czech Republic)

Page 12 - Here you report the use of personal laser mobile scanners (PLS). This type has seen rapid development in recent years and it is a significant mapping system for buildings, underground spaces and smaller sites. Accuracy is also questionable; conventional MLSs on cars have an accuracy of a few centimetres and a range of up to hundreds of metres, while PLSs have an accuracy of millimetres to centimetres and a range of up to a hundred metres, depending on the type. In many cases they are comparable. You write: Riegl VUX-1HA laser scanners has an accuracy of 5 millimeters. This is the accuracy of the device - scanner, static; when moving it depends on the IMU and the accuracy is an order of magnitude worse

Page 13: Point clouds are the outcome of mobile laser scanning... point cloud is an outcome from MLS, TLS, PLS and digital photogrammetry in general

Page 19: table – units are missing (milimetres?) It is explained in a footnote, but it's not appropriate

Paragraph 3.5 - there should be some references to the literature. Classifications of laser scanning data are important, e.g. also for ALS. It would be interesting to mention other possibilities of classification using 2D transformation and data reduction (e.g. dissertation and an article by M. Hůlková, 10.14311/AP.2018.58.0165)

The main goal of this thesis is to find and assess the available methods for extracting linear features, in practical and effective way and to assess its performance on specific data sets. The objective of the thesis was successfully achieved, as the semi-automated options significantly reduce the required human input and processing time. However, the semi-automated methods still require some human input.

For discussion: one can find a reason why remote computing or working with software on the server was problematic for users (frequent outages and software freezes). Not everyone can afford a very powerful computer, this should work fine.

## III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

*Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.*

The grade that I award for the thesis is **C - good**.

Date: **5.6.2023**

Signature:

