THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**FPGA-based Processing of LiDAR Data**
Author's name:	**Filip Kučera**
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Measurement
Thesis reviewer:	Viktor Walter
Reviewer's department:	Department of Cybernetics

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment — **extraordinarily challenging**

How demanding was the assigned project?

The task consisted of multiple challenging steps that the student had to complete, most of which involved familiarizing himself with new technologies and subsequently use them efficiently. For a bachelor thesis I would consider this to be a very challenging assignment.

Fulfilment of assignment — **fulfilled**

How well does the thesis fulfil 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.

The text of the thesis shows that the student completed all the points in the assignment from learning to understand and to use FPGA boards, all the way to developing and implementing a solution to the core task and evaluating the performance statistically. Not only that, but the student went beyond the letter of the assignment and showed on real experiment how the solution operates when used as a source of odometry on a real robot. The experiment showed technical limitations of the current system, but these were well documented and analyzed.

Methodology — **outstanding**

Comment on the correctness of the approach and/or the solution methods.

The student performed a thorough overview of existing methods and technologies used in the thesis. The student selected the approaches he used with various unusual considerations in mind, specific for the FPGA technology, the limitations of the available hardware as well as the complexity and time-requirements of the task. The mathematical evaluation of the system was thorough, albeit with sometimes slightly understated results.

Technical level — **A - excellent**

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?

The use of FPGA for processing of the LiDAR data is a reasonable and – as the student has shown – practically feasible approach to the task. The practical implementation as well as deployment of the solution shows, that the student has become proficient with using FPGA, with designing system architectures and using HLS.
The description is very thorough and seemingly fully replicable

Formal and language level, scope of thesis — **A - excellent**

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?

The formal side of the thesis is good. I see minor issues with English language, typical of intermediate users and common even among native speakers. I consider these to be largely irrelevant to grading of this thesis.

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Selection of sources, citation correctness	**A - excellent.**
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 have no objections on this front.	

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.
The quality and contribution of this work is good, and I recommend the highest grade. I have one question for the student – in figure 7, the scanlines appear fragmented into chunks of several 3D points. Why is this?

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 **A - excellent.**

Date: **30.5.2022** Signature: