THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Methods of Precise Remote Distance Measurement**
Author's name:	**Ganegama Vithanage Don Hirushan George Perera**
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Automation and Control Engineering
Thesis reviewer:	Ing. Bc. Šárka Němcová, Ph.D.
Reviewer's department:	Automation and Control Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment   **ordinarily challenging**

How demanding was the assigned project?

The work assumed knowledge outside the scope of bachelor courses, on the other hand only a basic measurement task was required.

Fulfilment of assignment   **fulfilled with major objections**

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.

In the review of remote distant measurement methods the author restricted himself to only three optical methods plus Eddy current sensors. There are totally wrong statements when describing the interferometers. The practical part consists of only a few measurements, poorly described and at least in one the data are wrongly processed.

Methodology   **partially applicable**

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

As mentioned above, there are major mistakes in the theoretical part. The measurement procedures are not clearly described, data are poorly or processed and the conclusions derived from the data are disputable.

Technical level   **E - sufficient.**

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?

As mentioned above.

Formal and language level, scope of thesis   **D - satisfactory.**

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?

There are some typos, incomprehensible sentences, wrong figure numbers (starting from fig 15), misused terms (recombined by a mirror), non-relevant instruments mentioned (LIGO). The thesis is organized in a logical way.

Selection of sources, citation correctness   **B - very good.**

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?

Please insert your comments here.

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.

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.

Generally, I appreciate the student had to study extra to understand laser interferometers, which is a topic for a master programme. On the other hand, there are serious wrong statements about interferometers (F-P interferometer measure distances of kilometers, Michelson IFm measures distances of galaxies). Same with confocal sensors: principle of the device on fig 1 not explained clearly, CL-3000 series has a measurement range of 10 mm and a resolution of 1 nm – not true, the resolution is 0,25μm.

Comments to the practical part:
schematics are missing, difficult to understand the setup and measurement procedure
units missing in tables
not mentioned the measurement with a micrometer was made more than once, no statistics of it presented
data from fig 29 wrongly processed, the calculated thickness is based on false data
piezo – measuring 10 steps (4,4μm) with the triangulation sensor that has uncertainty of 2μm is not correct, the less deriving conclusions from such a measurement

Questions:
1. Confocal sensor: What determines the range and what the resolution of the sensor? Or, how can be the range extended? What are the requirements for the lens aberrations?
2. Laser triangulation: how does the laser wavelength affect the accuracy and resolution of the measured distance? (page 32)
3. The measurement procedure is not well explained, why there is time on the x-axis for all measurements?

The grade that I award for the thesis is **E - sufficient.**

Date: **23.7.2023**   Signature: