

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	<b>Design of a Robotic Water Sampler for an Unmanned Aerial Vehicle</b>
<b>Author's name:</b>	<b>Daniel Štanc</b>
<b>Type of thesis :</b>	bachelor
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering (FEE)
<b>Department:</b>	Department of Cybernetics
<b>Thesis reviewer:</b>	Ing. Stanislav Tomášek
<b>Reviewer's department:</b>	Department of Electric Drives and Traction

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	extraordinarily challenging
<i>How demanding was the assigned project?</i>	
Assignment requires for a student to design and manufacture a complete water sampler module, encompassing mechanical design, electrical design (schematic and circuit board), prototype manufacturing, firmware of the embedded micro-controller, software driver for the system controller and overall coordination with architecture of an existing system. Being this a mere bachelor thesis I rate the assignment as extraordinarily challenging.	

<b>Fulfilment of assignment</b>	fulfilled with minor objections
<i>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.</i>	
The primary thesis' objectives were accomplished and the module was presented to be functioning in the existing system of the drone. Only reservation I have in the assignment fulfillment is with "Select appropriate parts for constructing the water sampler" part. Thesis does not describe any considered alternatives usable in the design, nor any comparison with a selected solutions.	

<b>Methodology</b>	correct
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
I find used methodology in both development and testing substantially correct. Student used current software and tools for thesis' realization. All steps are clearly oriented towards creating a functional prototype.	

<b>Technical level</b>	C - good.
<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>	
Technical aspects of the thesis are somewhat plagued with lackluster explanations of both design decisions and subsequent calculations. For example the switch mode power supply part is missing rationale for switching frequency selection, need for compensating capacitors in feedback is also not supported by any measurements. Schematic designs often use incorrect symbols for components. The design itself lacks protection features (ESD diodes, polarity guard diodes)	

<b>Formal and language level, scope of thesis</b>	B - very good.
<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>	
Used language is clear and adequately chosen for academic work, some typos and invalid notations do not interfere with legibility of the text. Use of English and TeX-based typesetting is a very positive factor. On the other hand, I have found description of the water sampler shallow, severely lacking with descriptions of taken design decisions and discussion of possible alternatives. Mechanical drawings, schematic and circuit board designs should be exported in vendor neutral format e.g. PDF, to allow for their inspection without any specialized software.	

## 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?*

Student had properly used citations of the others' work and provided with further directions for readers interested in further research this field. Amount and breadth of citations is fitting for the scope of presented thesis. Citations are generally targeting prior art in the relevant area or technical literature utilized for the prototype development.

## 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.*

Student had proven that he is capable of designing and developing a complex apparatus, taken from the initial assignment, through all development and subsequent manufacturing stages, right to the final testing and implementation into larger system, which is a remarkable feat for a student at the bachelor level.

The thesis' text is unfortunately very brief and does not sufficiently describe whole development process of the device – primarily taken approaches and component selection. These parts are simply described as-is, without any discussion on various alternatives and criteria.

This is a primary reason why I decided for a lower grade for this thesis – while the importance of delivering a solution for your assignment against all constraints is undisputed, it is equally important to thoroughly present and document your work.

Questions which I would like to be answered by the student during the defense

- 1) Many of used integrated circuits in your design are heavily influenced by ongoing supply chain disruptions. How would you address this issue?
- 2) Your design uses an USB which is a high-speed bus. Did you follow rules for implementing a high-speed bus in your design? What are generally the challenges of high-speed buses in PCB design?

The grade that I award for the thesis is B - very good.

Date: **22.1.2022**