

## I. IDENTIFICATION DATA

<b>Thesis name:</b>	<b>Design of Energy Independent Remote Monitoring System for Cargo Wagons</b>
<b>Author's name:</b>	<b>Jakub Ryšavý</b>
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Transportation Sciences (FTS)
<b>Department:</b>	Department of Transport Telematics, K620
<b>Thesis reviewer:</b>	Ing. Martin Šrotýř, Ph.D.
<b>Reviewer's department:</b>	Department of Applied Informatics in Transportation, K614

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>challenging</b>
<i>Evaluation of thesis difficulty of assignment.</i>	
The diploma assignment was challenging, but the student had a relatively large space for own creative solution.	

<b>Satisfaction of assignment</b>	<b>fulfilled with minor objections</b>
<i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i>	
The diploma thesis meets the assignment; some parts could be more extensive and final testing should include more parameters.	

<b>Method of conception</b>	<b>correct</b>
<i>Assess that student has chosen correct approach or solution methods.</i>	
The chosen approach is correct. The first part is theoretical and introduces us to the state of the art. Furthermore, the methodology is presented with functional, physical and communications viewpoint on the intended system. Then there is information about possibilities of HW and used technology for different parts of the system with their analysis. Finally, the proposed system is designed and the outputs and some results of testing are presented.	

<b>Technical level</b>	<b>C - good.</b>
<i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	
The theoretical parts of the work are processed quite clearly and at the appropriate resolution level. Unfortunately, the work has an unbalanced impression, some theoretical parts are unnecessarily long, and on the contrary, the practical part of thesis would deserve a larger scope and more detailed description of the individual parts and created website system. Also, own testing would deserve more elaborate processing and ideally expansion with other parameters.	

<b>Formal and language level, scope of thesis</b>	<b>C - good.</b>
<i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	
The structuring of the work could be better, some chapters should be better sorted and the main chapters should always start on a new page. The quality of some figures is low (e.g. Figure 2) and it would be good if the images were redrawn. Language level of thesis is good, there are few typing errors and misspelled, but it doesn't significantly reduce the quality of the thesis. The scope of work is generally appropriate, but student should focus more on own system design and following evaluation of the design, 9 pages are a small range for system like this.	

<b>Selection of sources, citation correctness</b>	<b>B - very good.</b>
<i>Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.</i>	

Student has chosen the proper approach for obtaining information, he used mostly quality resources and citations are in accordance with citation convention and standards. There are few links (10 citations) to Navipedia, which is a more professional wikipedia, but it is not, in principle, a fully credible source.  
And if you write a direct citation, as you have on page 13, you should also mention the specific page from the source.

### Additional commentary and evaluation

*Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.*

- For GNSS system there is a bit of confusion in accuracy. For GPS, you have an accuracy of 5-10 m and for GLONASS 3 m. And in the table at GLONASS Pro and Cons (table 8) you write that GLONASS got worse accuracy than GPS – it's a bit contradictory
- Table 11, which lists the summary of GNSS systems, should include at least an accuracy value - since it is a relatively important parameter for your entire system.
- ZigBee is reported to be covered by the 802.11.4 standard (on page 37) - this is an error, correct is IEEE 802.15.4.

### III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

*Summarize thesis aspects that swayed your final evaluation. Please present apt questions which student should answer during defense.*

The diploma thesis made me feel that with more time the work could be much better. It seems to me that the student devoted little time to work that deserved more, especially in the final part – description of designed system and its evaluation.

It is a pity that the student has no time left for further attempts to reduce power consumption and for example to test another device or other type of sensors (Sensors connected directly to the IoT network - e.g. LoRaWAN).

Nevertheless, despite these tiny shortcomings, the work is quite good.

I evaluate handed thesis with classification grade **C - good**.

#### Questions:

1. In table 4, you have filled in the values for "required sensor quality". On what basis did you determine the values? What should I imagine under "medium" or "high" value?
2. For the evaluation of all GNSS systems, you provide a "maintenance risk point". For the US and China, you have it on a "pros" side – It means that there cannot be a problem with maintenance. For Russia and EU, you have it in "cons" side. Does it mean that you are expecting some problems with maintenance there? Based on what did you assess whether it is plus or a minus? Is it your own opinion or do you have some backgrounds/sources for it?
3. For short-range communication, you wrote that WiFi is not suitable for high power consumption due to the focus on high-speed data transfers. (Page 36) Do you know that there are different WiFi standards? Did you encounter an IEEE 802.11ah standard in your research? It is a WiFi standard designed for similar needs as your system. Would you also consider this WiFi as an option for your system?

Date: **16.6.2017**

Signature: