
SPACEMASTER DIPLOMA THESIS REVIEW

- supervisor -

Name of student: **Alexander Schneider**

Thesis topic: **Development of a Human Machine Interface and Communication System with a future IO-Link Master Test Device**

Technical supervisor: Lukáš Hamáček, Siemens

CTU Supervisor: Pavel Burget, Ph.D., DCE FEE CTU in Prague

Alexander spent two semesters working on an project at the Development centre of Siemens in Prague. This diploma thesis is the result of his work during the second semester when he was working on the design of a communication protocol and HMI to a general IO-Link test device.

The thesis is well structured and deals separately with the developed communication system and with the developed human-machine interface. Great attention is put to the code to be well structured and clearly written while abiding the best algorithmic and coding practices. Some parts of the code are also capable of running on multiple platforms which are represented by a PC and by an embedded platform in the thesis. The proposed protocol is rather simple but it fulfils the requirements for data to be exchanged between the test device and the HMI. Moreover all parts of the protocol and their implementation are described very well and in a consistent way. It shows that Alexander really knew what he was doing, and proves that he would be able to work on a much more complex communication system in the future, eventually.

The HMI design of the PC application is based on the MVVM pattern for which support is available in the Microsoft WPF platform. This platform has been chosen for the HMI implementation. Alexander has conducted a user-experience research regarding the UI design and mentions some basic principles in the thesis. The whole UI contains a lot of features that were defined by the application requirements. These features enhance the possibilities how the application can be used.

The thesis of Alexander Schneider is extraordinary in its form but mainly in its contents. The resulting application is a full-featured industrial-grade application that will be used by the development engineers in Siemens in their subsequent IO-Link related projects. Alexander did not just implement the required functionality but first of all he implemented it in a clear and concise way that makes the application reliable, maintainable and user friendly.

Based on the above arguments I recommend the diploma thesis of Alexander Schneider for defense and asses it with **grade A (excellent)** in accordance to ECTS.

Prague, September 9, 2016

Pavel Burget



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CTU Diploma Project review- 2nd reviewer's evaluation of master thesis with title "Development of a Human Machine Interface and Communication System with a future IO-Link Master Test Device " by Space Master student Alexander Schneider.

I find that the goal of the thesis project well fulfils the requirements of a master thesis in space technology. The work concerns development of a communication layer between the application layer and lower layers (i.e. USB) and a human machine interface for the IO-Link.

Chapter I gives a brief background to the problem domain and Chapter II gives a background to the reader concerning the most important components of the final system, such as the USB. Chapter III and IV presents the final solution and implementation of the protocol and human machine interface respectively. In Chapter V closing remarks are given.

The thesis shows that the student has work in a standardized and methodical manner, using well established design tools and patterns. Also, the student have solved one of the problems introducing a non-conventional way of design (chapt. 10.2.1 fig 10.6) which I think might be useful for future software projects.

The thesis is well written and even if a lot of details are included (and shall be included) the student manages to present the project and the relevant background information in a very clear way. The thesis would have benefited from having a section with the requirements for the projects assembled, thereby helping the reader to understand the problem, the motivations for the choices of the final solution, and the results, better.

The student has laid down a substantial amount of highly qualified work, and shows a good understanding of the principles of the subject and their application. The result of the thesis project has a high maturity and will contribute to future technology for industrial automation.

Based on the review above I recommend to grade the thesis by A(*excellent*). The oral presentation is still to be graded.

This review serves solely for the purposes of the diploma project defense at CTU. LTU official evaluation for the SpaceMaster double degree will follow the thesis defense and may differ from this review report and suggested grade.

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