

## SpaceMaster Diploma Thesis Review - supervisor -

**Name of student:** Lucas Almeida Cypriano

**Thesis topic:** Study and Design of an Adaptive Control Law for Spacecraft Attitude Control

**Technical supervisor:** Prof. Dennis Bernstein, University of Michigan

**CTU Supervisor:** Ing. Martin Hromčík, Ph.D., DCE FEE CTU in Prague

Lucas spent last three months in the Triax laboratory of the University of Michigan. He worked there, under supervision of Prof. Dennis Bernstein, on a project of adaptive attitude controller for a satellite. The covered tasks concern both the „theoretical“ part (simulations, modelling) as well as experimental validation on a test bench.

Formally, the document is well structured in my opinion but one can find quite a few typos and mistakes, indicating perhaps that the proofreading could not have been done much intensively due to lack of time.

I cite here a short excerpt from an informal evaluation of prof. Bernstein, the technical supervisor at Michigan University:

Lucas is clearly a talented and hardworking student, and I was pleased to host him. Lucas improved the testbed significantly, and his contribution will benefit future research. Unfortunately, one of the motors failed about 2 weeks ago, and this prevented him from testing the adaptive controller.

Based on the above arguments, and mainly on Dennis Bernstein's recommendation, my suggestion is

grade B

in accordance to ECTS.

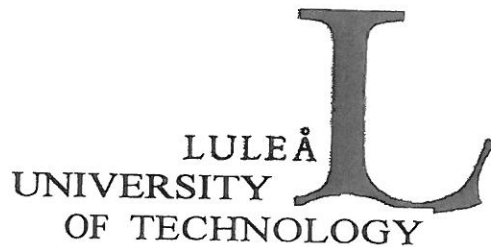
Supervisor:

Ing. Martin Hromčík, Ph.D.

2014/06/17

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Date

  
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Signature



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of Electrical Engineering  
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CTU Diploma Project Review  
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**CTU Diploma Project review- 2<sup>nd</sup> reviewer's evaluation of master thesis with title  
Study and Design of an Adaptive Control Law for Spacecraft Attitude Control" by Space Master  
student Lucas Almeida Cypriano.**

I find that the goal of the thesis project fulfils the requirements of a master thesis in space technology. The work concerns simulations an adaptive control law for spacecraft attitude control. The project includes both simulations and experimental testing of the algorithms.

The thesis includes theory, modelling, controller design and implementation, and testing using hardware. I judge that the student has put sufficient effort in the task.

The literature survey is brief regarding other relevant control concepts used for similar projects. The background part of a thesis is intended to give the reader background knowledge and to show that the student understands the problem and has knowledge within the whole process of the performed project. The thesis gives a mathematical background to attitude representation and to relevant control algorithms used in the project. Since main parts are based on other sources, but has not been rewritten for more clarity, it is not obvious from the written report to what extent the student has understood the theoretical background.

The discussion on the results is also somewhat brief. The thesis would have benefited from a deeper analysis of results and a comparison with results from similar studies.

The oral presentation is still to be graded. If the oral presentation is sufficient and the student show proper background and theoretical knowledge I recommend grading the thesis by B.

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

Dr. Anita Enmark  
Luleå University of Technology