SUPERVISOR'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	**FORESAIL-2 AOCS Trade Studies and Design**
Author's name:	**Guillaume Le Bonhomme**
Type of thesis:	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Control Engineering
Thesis supervisor:	Dr. Andris Slavinskis
Supervisor's department:	Aalto University, Department of Electronics and Nanoengineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **extraordinarily challenging**

Evaluation of thesis difficulty of assignment.

Please insert your commentary.

Satisfaction of assignment **fulfilled**

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.

Please insert your commentary.

Activity and independence when creating final thesis **A - excellent.**

Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.

Please insert your commentary.

Technical level **A - excellent.**

Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.

Please insert your commentary.

Formal and language level, scope of thesis **A - excellent.**

Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.

Please insert your commentary.

Selection of sources, citation correctness **A - excellent.**

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.

Please insert your commentary.

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.

A tradeoff analysis of a space mission is always challenging due to the limited resources (power, mass, finances, time, etc.) and the drive to do more (e.g., take more measurements, include another instrument). Tradeoff analysis of a 4-kg satellite crossing a Van Allen radiation belt is indeed extraordinarily challenging. As far as I know, such analysis is not available publicly. Therefore, the thesis presents novel results which will be published in a scientific journal.

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III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation.

Guillaume Le Bonhomme is an excellent student. He received a somewhat loosely defined task and was able to carry out much of the work independently – literature search, requirements definition, simulations, analysis and writing. He presented the progress at weekly meetings and at FORESAIL science meetings (attended by 30-40 scientists and engineers of the FORESAIL Excellence Centre). During these meeting, he received feedback which helped to improve the analysis and make decisions on system design. Needless to say that Guillaume's work is extremely valuable for Aalto University and the FORESAIL-2 mission.

I evaluate handed thesis with classification grade **A - excellent.**

Date: **26.8.2020**

Signature:

Andris Slavinskis

LULEÅ UNIVERSITY OF TECHNOLOGY

Czech Technical University
Faculty of Electrical Engineering
Department of Control Engineering

CTU Diploma Project review- 2nd reviewer's evaluation of master thesis with title " FORESAIL-2 AOCS Trade Studies and Design " by Space Master student Guillaume Le Bonhomme

I find that the goal of the thesis project well fulfills the requirements of a master thesis in space technology. The thesis concerns design of a cubesat, the FORESAIL-2.

The design choices are well motivated, and explained, and I therfore have very few comments.

One figure which I do not understand completely, is Figure 4.27, FORESAIL-2 Mode architecture. From the figure it looks like the safe mode will be entered, and that this mode cannot be left.

The thesis is well-written and easy to read. The student shows a broad understanding of the subject and the task at hand, and shows insight into many fields needed for design of a satellite.

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.

Kiruna, September 25 2020

Dr. Anita Enmark
Luleå University of Technology