ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

SUPERVISOR'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	**Multi-UAV trajectory planning in unknown environments with limited information sharing**
Author's name:	**Afzal Ahmad**
Type of thesis:	Diploma thesis
Faculty/Institute:	Faculty of Electrical Engineering
Department:	Department of Computer Science
Thesis supervisor:	Ing. Vojtěch Spurný, Ph.D.
Supervisor's department:	Department of Cybernetics

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

Evaluation of thesis difficulty of assignment.

Submitted diploma thesis with the goal to realize decentralized collision-free planning for multiple UAVs in unknown environments with limited information sharing is divided into several parts that need to be done to fulfill the goal. Those parts are: the theoretical research, implementation part, and evauation part. Due to the diverse set of skills required for the thesis, I consider it rather challenging.

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.

The assignment was fulfilled.

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.

The student worked on the thesis without problems throughout the whole year. Over the scope of the thesis, he was actively involved in the run of the MRS group activities where he helped with multiple other experiments and research. During the work on the thesis, the student respected all supervisor's remarks and suggestions. However, the presented work is mostly the result of a student's initiative and invention.

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.

The technical level of the text is excellent.

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

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

The text of the thesis is well structured and easy to follow.

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.

The student selected relevant sources and properly used them through the text of the thesis. He correctly selected the most recent ones that represent the current state-of-the-art for the multi-robot planning.

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.
Please insert your commentary (voluntary evaluation).

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation.

The goal of the thesis is challenging and relevant to the current ongoing scientific research. This can be seen for example by the list of references that were selected by the student. Those works were mostly published in the last 2 years. Compared to the other students that I have the chance to lead as the supervisor, the author of the thesis showed that he is able to work alone and come up with solutions to problems. Besides the work on this thesis, the student was involved in research in the multi-robot system group at CTU. In particular, he is the author or co-author of three conference papers that are on the Web of Science (WoS), and he is currently working on an article that will be sent to a high-impact journal. This work shows knowledge and skills which the student obtained during his studies and which he hopefully further extends during PhD studies that he is considering applying for. I evaluate the thesis with a classification grade **A-excellent**.

Date: 3rd June, 2022 Signature: