MASTER'S THESIS ASSIGNMENT

I. Personal and study details

Student's name:	**Śmiałek Adam**	Personal ID number:	**492264**
Faculty / Institute:	**Faculty of Electrical Engineering**		
Department / Institute:	**Department of Control Engineering**		
Study program:	**Cybernetics and Robotics**		
Branch of study:	**Cybernetics and Robotics**		

II. Master's thesis details

Master's thesis title in English:

Simulation and control toolkit for small satellite projects

Master's thesis title in Czech:

Programovy balik pro simulaci a navrh rizeni malych satelitu

Guidelines:

The goal of the project is to propose, implement and demonstrate value of a software framework supporting teams building small satellites - typically CubeSat student projects - during the initial phases of conceptual design, mission planning, and selection and sizing of components. In relation to requirements coming from the expected navigation and flight control functionalities.
1. Make a review of existing related tools. Both from the large satellite business, and the small satellite community. Present a comparative analysis of strengths and weaknesses of existing solutions.
2. Based on the review, prepare a study and the software concept proposal showing specifically the need for this work and expected compatibility of the toolkit with relevant other packages.
3. Propose and implement essential data structures and procedures of the toolkit. Focus on the aspects of conceptual design, mission planning, selection and sizing of components, simulation, design and validation of control laws for ADCS (attitude determination and control system).
4. Demonstrate usefulness of the toolkit on a case study, inspired by selected previous small satellite projects - either your own or described in literature.

Bibliography / sources:

[1] Bryson Jr., Control of Spacecraft and Aircraft, Princeton University Press, 1994.
[2] Blakelock, Automatic Control of Aircraft and Missiles, Wiley, 1991.

Name and workplace of master's thesis supervisor:

doc. Ing. Martin Hromčík, Ph.D., Department of Control Engineering, FEE

Name and workplace of second master's thesis supervisor or consultant:

Date of master's thesis assignment: **13.02.2020**   Deadline for master's thesis submission: **14.08.2020**

Assignment valid until:
by the end of winter semester 2021/2022

doc. Ing. Martin Hromčík, Ph.D.	prof. Ing. Michael Šebek, DrSc.	prof. Mgr. Petr Páta, Ph.D.
Supervisor's signature	Head of department's signature	Dean's signature

III. Assignment receipt

The student acknowledges that the master's thesis is an individual work. The student must produce his thesis without the assistance of others, with the exception of provided consultations. Within the master's thesis, the author must state the names of consultants and include a list of references.

_____._____
Date of assignment receipt

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Student's signature