MASTER'S THESIS ASSIGNMENT

I. Personal and study details

Student's name: **Hodná Jitka** Personal ID number: **439565**

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:

Indoor localization system for automated vehicles based on Ultra-Wideband technology

Master's thesis title in Czech:

Interiérový lokalizační systém pro autonomní prostředky s využitím technologie Ultra-Wideband

Guidelines:

1. Study the state of the art data fusion principles used for pose estimation. Study principles of Inertial navigation systems (INS)
2. Propose a localization system for autonomous vehicles based on fusion of data from Ultra-Wideband (UWB) positioning system and on-board dead-reckoning sensors such as Inertial measurement unit (IMU)
3. Evaluate proposed localization system for use in industrial environments.

Bibliography / sources:

[1] THRUN, SEBASTIAN, WOLFRAM BURGARD, AND DIETER FOX - PROBABILISTIC ROBOTICS, 2005 - Massachusetts Institute of Technology, USA (2005)
[2] GREWAL, MOHINDER S., ANGUS P. ANDREWS, AND CHRIS G. BARTONE - GLOBAL NAVIGATION SATELLITE SYSTEMS, INERTIAL NAVIGATION, AND INTEGRATION - John Wiley & Sons, 2020
[3] KELLY, ALONZO - MOBILE ROBOTICS: MATHEMATICS, MODELS, AND METHODS - Cambridge University Press, 2013
[4] MOORE, THOMAS, AND DANIEL STOUCH - A GENERALIZED EXTENDED KALMAN FILTER IMPLEMENTATION FOR THE ROBOT OPERATING SYSTEM, Intelligent autonomous systems 13. Springer, Cham, 2016. 335-348
[5] HOL, JEROEN D., et al. - TIGHTLY COUPLED UWB/IMU POSE ESTIMATION, 2009 IEEE international conference on ultra-wideband. IEEE, 2009
[6] LI, JIAXIN, ET AL. - ACCURATE 3D LOCALIZATION FOR MAV SWARMS BY UWB AND IMU FUSION, 2018 IEEE 14th International Conference on Control and Automation (ICCA). IEEE, 2018.

Name and workplace of master's thesis supervisor:

Ing. Tomáš Novák, Datavision s.r.o.

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

Ing. Martin Hlinovský, Ph.D., Department of Control Engineering, FEE

Date of master's thesis assignment: **15.01.2021** Deadline for master's thesis submission: **13.08.2021**

Assignment valid until:
by the end of winter semester 2022/2023

Ing. Tomáš Novák	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 her 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.

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Date of assignment receipt	Student's signature