# Supervisor assessment of Bachelor's Thesis

**Student:** Vaško Marek

**Title:** Autonomous Rover Navigation on Planetary Surface (id 22728)

**Supervisor:** Chudý Peter, doc. Ing., Ph.D. MBA, DCGM FIT BUT

1. **Assignment comments**
   The aim of the thesis was to compose, implement and evaluate an autonomous navigation solution, backed by applicable sensor technology, to safely guide an exploration rover operating on a remote planetary surface. The non-trivial nature of the navigation task originates from the autonomous localization and mapping requirement arising from the general unavailability of continuously updated high definition planetary surface maps and the lack of satelite constellation based navigation technology known from the Earth. For the author to be able to formulate a candidate navigation solution he needed to gain a deeper understanding on respective sensor technologies, applicable navigation algorithms, state-of-the-art drone control laws, and exploration rover modeling and simulation. Beyond the algorithm implementation effort, the author has designed his own wheeled rover model and integrated it into an intuitive visualization which helped in understanding of the resulting autonomous behavior. Based on the previous conditions I consider the overall difficulty to be above average.
2. **Literature usage**
   The author worked successfully with a portfolio of topic relevant references and performed a tailored research on autonomous navigation algorithms along with applicable sensors, 6-wheel rover control laws and high fidelity rover modeling and simulation. The author successfully mastered the utilization of published resources to compose candidate autonomous navigation solutions using available sensors.
3. **Assignment activity, consultation, communication**
   The author demonstrated a high level of commitment in achieving excellent results. The author attended scheduled meetings regularly, was well prepared and contributed meaningfully to the meeting discussions. The author was able to draw individual conclusions and transforming them into a functional concept. Communication with the author was conclusive and punctual.
4. **Assignment finalisation**
   Both, the text of the thesis and the implementation part have been finished in advance of the deadline and the content has been examined. Minor adjustments to the author's ideas originating from the meeting discussions and periodic reviews have been included into the thesis.
5. **Publications, awards**
   Unknown
6. **Total assessment** **excellent (A)**
   The student's overall activity and his motivation were at a high level throughout the entire work on the thesis. Achieved results exhibit a level of authenticity, which makes the autonomous navigation for planetary exploration rovers a good staring point for further studies in autonomous guidance, navigation and control. The amount of demonstrated knowledge, enthusiasm and focus needed for successfully accomplishing the thesis was above the usual expectations. I recommend the thesis for a defense. Suggested grade as based on the above mentioned: **Excellent (A)**.

In Brno 18 August 2020

Chudý Peter, doc. Ing., Ph.D. MBA
supervisor