

Abstract

This bachelor thesis deals with the use of unmanned aerial vehicles (UAV) in precision agriculture. UAVs are one of the many tools used in Earth remote sensing (RS), their task is to monitor object without physical contact. Over the past 20 years, UAVs have been expanding in a wide variety of areas, massively in precision agriculture.

This thesis compares the UAV with the classical means of RS and through demonstrations of real UAV deployment in selected case studies - *Applications of Low Altitude Remote Sensing in Agriculture*, *Weed Mapping using Object-Based Analysis of UAV images*, *Low-altitude, high-resolution aerial imaging systems for row and field crop phenotyping and Estimating Biomass using Crop Surface Models* show wide possibilities of data collection, processing and evaluation, covering the full spectrum of important information usable in precision agriculture.

UAVs and their use in precision agriculture is an area that is expected to expand dynamically and which, compared to standard data collection, only positives. The greatest advantage is immense flexibility in terms of both deployment and sensor layout, high accuracy of data acquisition, ease of operation, affordability and, consequently, the availability of software specialized in processing such data. The only possible disadvantage is the relatively small capacity of the batteries, which currently allows for an operating time of about 15 - 30 minutes.

Simultaneously with the benefits mentioned above, the ecological benefits also arise, both in data collection itself and especially after application of the results in precision agriculture. For example, reducing soil compaction due to unnecessary heavy machinery movements, reducing emissions, minimizing the use of pesticides and fertilizers, and reducing their impacts on the farmland and its surroundings, increasing yields, reducing eutrophication of water due to discharges and, in general, improving the ecosystem as a whole.

Key words: unmanned aerial vehicles (UAVs), precision agriculture, remote sensing (RS)