

Novel Flying EM Sensor for Agricultural Research

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Information on soil properties is of vital importance for crop development but very difficult to obtain from the online data stores such as satellite imagery repositories and digitized soil maps. While evaluating various EO (Earth Observation) data sources potentially usable for enhancement of precise agriculture, we have confirmed the limitation of the existing soil data. Therefore, as a part of EU HORIZON 2020 research and innovation program, PARSEC Consortium, under grant agreement #824478 “Crop Predictions Take Flight – Linking Genomics and Geophysics”, SiberGeo and Landviser have developed a new mobile universal soil EC sensor (EM) as payload on the octocopter UAV.

The mobile UAV EC sensor **EMGeoDrone** (IP SiberGeo) would provide detailed data on soil properties **at multiple depths** for breeding analysis, especially for developing stress-resistant (salinity, drought) and nutrient-efficient (N fertilizer utilization) crop varieties.



EMGeoDrone parameters:

- Generator diameter: 300 mm
- Number of turns in generator coil: 21/2
- Pump supply voltage: 8.5 V
- Receiver diameter: 50 mm
- Number of turns in receiving coil: 42
- Preamplifier gain total: 2000
- Total weight of the device without handle and footrest: 3328 g.

The device flights at precise height 20-40 cm, measuring EC at 3 frequencies, corresponding to 3 depths, approximately 0.5, 1.0 and 2.0 m. The precise height stability is obtained by lidar sensor usage. Electric resistivity measurement can be shown as maps of resistivity at various frequencies (depths) and various height of flight.

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This talk will be presented on 16-18 August 2021 at <https://seg.org/Events/Application-of-Proximal-and-Remote-Sensing-Technologies-for-Soil-Investigations>