Implementation of a Complete Process for the Collection, Processing and Use of UAV Multi-Spectral Data for Agriculture

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SUMMARY

Agriculture is a sector particularly vulnerable to weather conditions and climate changes. The increasing frequency of extreme events directly impacts agricultural stakeholders at various levels, from sustaining the operations of a farm to the global food security challenges. Faced with these significant issues, various stakeholders seek to optimize the reliability and operational efficiency of the tools at their disposal by integrating information technologies such as remote sensing to ensure a fair and affordable management system for the farmer.

This approach makes studies of identification, measurement, and correction valuable for necessary improvements in the agricultural field, especially for intensive farming. Additionally, the growing use of UAV for field data collection greatly contributes to the quality of acquisitions and studies conducted. This enables more precise and reliable results, facilitating decision-making.

In particular, the use of UAV equipped with multispectral sensors is widely employed for agricultural monitoring. This allows for the detection of elements that were previously invisible to the eye. Compared to satellites, including new nanosatellite technologies equipped with high-quality sensors, high spatial and temporal resolution, and historical data storage in catalogs, UAV offer increasing advantages. This is due to their ease of use with various sensor types, high radiometric, spectral, geometric, and spatial resolution, and quicker adjustment of general parameters.

The objective of this study is to assess and establish production chains that correspond to market needs. It aims to establish a technically and financially stable data production method. A comprehensive data processing analysis will also be conducted, including georeferencing, image classification and analysis, examination of data coherence, accuracy, and longevity, identification of

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production and utilization limitations, analysis of technical constraints for the generalization of each method, an economic approach to the implementation of proposed methodologies, and a comparison of all elements with recommendations.