

## Airborne Hyperspectral Imagery for Agricultural Businesses in Malaysia

### ABSTRACT

The Forest Geospatial Information & Survey Lab in cooperation with Aeroscan Precision (M) Sdn Bhd at Lebu Silikon, Universiti Putra Malaysia, spent the last four years developing airborne hyperspectral remote sensing and GIS applications, many of which address agriculture, forestry and the environment. This paper wants to make clear from the outset. Despite the lack of significant commercial success for businesses trying to sell airborne hyperspectral remote sensing data and services to agriculture, the only currently available imaging technology being pioneered and developed in UPM, does work. There is no doubt of its benefits to the agriculture industry especially the oil palm plantation giants in saving money, time, increasing yield, enhancing best practices, protecting the environment, and more. Despite that, the company just not made a “real” business of it perhaps due to the market for airborne hyperspectral remote sensing products and services related to agriculture, is still not known to most state and federal departments and agencies on the other. The consumer, for now, is not really in the picture. The commercial side can be broken down into the growers, who produce the food, Farmers Coops that may include growers but also produce food products and food providers. While some states have huge agricultural bases, few have money to invest in airborne hyperspectral remote sensing, which leaves quite a lot of burden on the federal government. The UPM-Aeroscan Precision (M) Sdn Bhd experience launched in 2004, planned to serve the commercial agricultural market by bringing the benefits of airborne hyperspectral remote sensing, also provide a real-time “GIS-ready” made database, and timely crop yield information to the plantation sector and farmer. The vision was simple: the farmer would build his own real-time airborne remote sensing GIS-ready made database documenting fertilizer, watering and planting details in the software (something typically done in a notebook by future high-tech Malaysian graduated farmers) with the use of a crop model to predict the expected yield. The check was to compare that expected outcome to the reality of the airborne hyperspectral remotely sensing images. For that level of detail, the UPM-APSB’s AISA very high resolution airborne hyperspectral imagery (1 m), and in near real-time could only provide the solution for the Malaysian modern generation farmers in the hope that computer technology will reach them. In this paper, what UPM-APSB’s AISA airborne hyperspectral remote sensing can bring to agriculture is demonstrated. First off, it can be used to monitor yields, early in the season, and then later. Second, airborne hyperspectral remote sensing can delineate soil zones. A third area of benefit is in field delineation where the boundaries of crops, in support of regulatory procedures could be easily found. The final area is precision agriculture, about best practices, giving a crop just the water, fertilizer, herbicide, etc. it needs to grow to its potential, but no more. The authors feel strongly that precision agriculture could have a significant impact on the Malaysian future environment. If the UPM-APSB’s AISA near real-time data can map and provide just enough nitrogen, the impact on the environment is reduced and the plants should still provide their maximum yield. Applying this just enough vision should save the farmer’s money on herbicide, water, fertilizer and other such costs.

**Keyword:** Precision agriculture, Remote sensing, Commercial, Oil palm, Sensor

