

Precision Forestry Using Airborne Hyperspectral Imaging Sensor

ABSTRACT

Universiti Putra Malaysia in collaboration with a private company, Aeroscan Precision (M) Sdn Bhd based in UPM Serdang conducted a research and commercial applications of airborne hyperspectral sensing data in precision forestry. The UPM-APSB's AISA sensor was flown over a representative series of forested areas in Peninsular Malaysia from 12-20th. July 2004. It is a pushbroom imaging spectrometer recording remote sensing images over a large spectrum of wavelengths from the visible (400 nm) to near infrared (1 000 nm). Images have a ground pixel size of 1m by 1 m at a flight altitude of 1 000 m a.s.l and a constant flight speed of 120 knots. The ground validation segment of the projects was focused around hill/montane dipterocarps,. In order to characterize the properties and status of the forests, a number of images and field spectrum were developed. Prior to and after the flight, field spectral reflectance measurements using a handheld FieldSpec spectroradiometer were taken over the timber species of interest. The use of spectral unmixing methods for the discrimination of individual timber species image components leading to a more accurate identification of timber species, timber inventory and volume estimates were evaluated. The results imply that UPM-APSB airborne hyperspectral imaging technology would enable the development of a rapid forest resources assessment, especially in the sustainable forest management in Malaysia and other tropical countries.

Keyword: Airborne, Hyperspectral imaging, Precision forestry, Sustainable management