

## UPM-APSB AISA Airborne Hyperspectral Technology for Managing Mangrove Forest in Malaysia

### ABSTRACT

Mangrove forests are one of the most productive and bio-diverse wetlands environments on earth. In Malaysia, Forestry Department of Peninsular Malaysia (FDPM) has always been fully committed to the implementation of the sustainable forest management practices and in line with current concerns such as climate change, conservation of biodiversity and Tsunami, have brought about a heightened expectation on the political, socio-economic, ecological and environmental well-being of the country. Thus, managing mangrove forests is very challenging to the department and a precise geospatial database is urgently required. The objectives of this paper are to assess the capability of UPM-APSB's AISA airborne hyperspectral imaging sensor for developing a geospatial database through an individual mangrove species mapping and to determine the wavelength regions that define the inherent spectral characteristics amongst mangrove species. A total of nine groups of mangrove species spectral separability were identified in Port Klang, Selangor namely *Lumnitzera littorea*, *Rhizophora mucronata*, *R. stylosa*, *Sonneratia alba*, *Avicennia officinalis*, *R. apiculata*, *Bruguiera parviflora*, *B. gymnorrhiza*, *B. cylindrical* and *S. caseolaris*. The species were easily identified and separated in the NIR range (700 nm to 900 nm) with the following spectral values namely (a) 1,750-6,000: *B. cylindrical*, (b) 2,000-7,750: *B. gymnorrhiza*, (c) 1,875-8,250: *B. parviflora*, (d) 1,875-5,500 : *A. officinalis*, (e) 1,625-6,250 : *S. caseolaris*, (f) 1,875-5,250: *S. alba*, (g) 1,750-7,500: *R. apiculata*, (h) 2,000-8,000: *R. stylosa*, (i) 2,200-7,000: *R. mucronata*. Results of this study indicated that the mangrove species could only be identified at the near infrared (NIR) wavelength (700 nm to 900 nm) and not in the visible (VIS) spectrum. With such a capability, the sensor should be in a position to provide a geospatial database of the Malaysian mangroves for Tsunami management and other purposes of interests. Future management of mangrove forests in P.Malaysia should then adopt an integrated approach by further refining the current management and incorporating latest findings and updated latest geospatial information through more vigorous airborne hyperspectral data acquisition on mangrove forest. With the future geospatial database developed from the sensor, the National Forestry Policy and other policies related to mangrove forests management can be revised from time to time to match latest prevailing conditions and requirement. The future success in developing a mangrove geospatial database using UPM-APSB's AISA data by FDPM will in fact contribute to the sustainability of the wetlands in Malaysia which is crucial to the survival and future health of our Mother Earth.

**Keyword:** Mangrove, Airborne sensing, Hyperspectral, Mapping, Management, Tsunami