

## **Low-cost UAV for visible, NIR and thermal sensors platform**

### **ABSTRACT**

Low-cost UAVs have a limit on the sensor payload in dimension and acquire a higher number of aerial images in terms of image resolution and produced less accurate results. Therefore, accurate calibration will improve the quality of the image data. The objectives of this research are to develop fully autonomous lowcost hexacopter UAV, perform an accurate calibration of the multispectral sensor and develop a technique to monitor the vegetation cover using modified NDVI and thermal derived data. These studies cover components calibrations, diagnose problem, and flight planning using fully autonomous vertical take-off and landing capabilities and reduce the line-ofsight telemetry. The total cost of the Hexacopter UAV system is USD 2000, which is far cheaper than commercial UAV, with a weight less than 4kg and sensor payload up to 1.5 kg. The sensor calibration used were RGB (Canon SX230 RGB), NIR (SX230 670nm to 750nm, SX260 above 750nm, Tetracam 520 nm to 920 nm) and Thermal (MobIR M8 8 to 14  $\mu$ m).

**Keyword:** UAV; Hexacopter; Sensor; Calibration; Lightweight