THERMAL MONITORING SYSTEM FOR MEDIUM-VOLTAGE OVERHEAD CONDUCTOR WIRES BASED ON THERMAL DRONES

FAIZAL RIZQI FEBRIAN
Electrical Engineering Study Program, Faculty of Science and Technology
University of Technology Yogyakarta
Jl. Ringroad Utara Jombor Sleman Yogyakarta
E-mail: faizalrfebrian@gmail.com

ABSTRACT

The increasing electrical load on insulator wires of Medium-Voltage Overhead Lines significantly impacts temperature anomalies, as higher current flow can lead to wire overheating. Effective monitoring plays a critical role in identifying and addressing issues before they cause further damage to the power distribution system. With advancements in technology, the deployment of drones equipped with thermal sensors has emerged as an innovative solution for monitoring electrical infrastructure. Thermal drones are capable of detecting temperature in real time and provide essential data for further analysis. This study does not focus on anomaly detection from thermal video footage, but rather on the application of the DJI Matrice 4 Thermal and DJI Mini 4 Pro drones for monitoring the temperature of insulators in electrical networks. The DJI Matrice 4 Thermal delivered accurate results at an altitude of 9.4 meters and 2 meters using the home point mode, IronRed color palette, and SBS (Side-by-Side) feature, which facilitated comparisons between thermal and optical images. The DJI Mini 4 Pro produced the clearest visuals at 1.5 meters using 2× zoom, while image quality decreased at a distance of 3 meters. Temperature analysis using Thermal Analysis Tool 3 revealed that environmental factors influence temperature readings, highlighting the importance of automated flight features to maintain stable distances and improve measurement accuracy.

Keywords: Drone, Visual Data, Thermal Analysis Data.