INTISARI

Cat surya berpotensi sebagai alternatif pembangkit listrik yang ramah lingkungan dan mudah diaplikasikan di berbagai permukaan seperti, dinding rumah, gedung-gedung tinggi, jalan, dan jembatan. Namun, metode aplikasi cat surya yang ada dalam skala laboratorium berbeda dengan metode pengecatan dalam konstruksi dan bangunan yang dilakukan secara manual menggunakan kuas, roll, dan spray. Selain itu, aktivitas pengecatan manual ini juga berisiko bagi kesehatan pekerja, seperti gangguan otot dan tulang rangka, gangguan mata dan pernapasan, serta risiko jatuh dari ketinggian yang dapat menyebabkan cedera ringan hingga kematian. Laporan Skripsi ini bertujuan merancangan sistem pengaplikasian cat surya berbasis *drone* untuk aplikasi di bidang konstruksi dan bangunan. Sistem dirancang dengan mempertimbangkan aspek internal dari desain sistem yang telah ada dan aspek eksternal dari tren pengembangan alat pengecatan dalam bidang konstruksi dan bangunan. Spesifikasi sistem ditentukan berdasarkan analisis kebutuhan dan benchmarking terhadap spesifikasi produk *drone* yang tersedia. Lima alternatif konsep dikembangkan berdasarkan spesifikasi yang telah ditentukan. Pemilihan konsep dilakukan dengan metode *scoring* terhadap desain referensi sistem pengecatan struktur eksterior kapal berbasis UAV. Konsep drone dengan penyemprotan ultrasonic air assisted terpilih melalui metode *scoring*. Sistem terkonfirmasi dapat menghasilkan lapisan cat surya dengan PCE yang tinggi, di atas 10%, berdasarkan tinjauan literatur. Sistem memiliki kapasitas 10 liter cat, lebar pelapisan 4 - 15 cm, jangkauan pengecatan lebih dari 8 meter, dan supply energi listrik yang kontinu.

Kata Kunci: Desain Sistem, Cat Surya, *Drone, Ultrasonic Air Asissted*

ABSTRACT

Solar paint has the potential to be an environmentally friendly alternative to electricity generation and is easy to apply on various surfaces such as house walls, tall buildings, roads and bridges. However, the existing solar paint application method on a laboratory scale is different from the painting method in construction and buildings which is done manually using brushes, rolls and sprays. Apart from that, manual painting activities also pose risks to workers' health, such as muscle and skeletal disorders, eye and respiratory problems, as well as the risk of falling from a height which can cause minor injuries or even death. This thesis report aims to design a drone-based solar paint application system for applications in the construction and building fields. The system is designed by considering internal aspects of existing system designs and external aspects of painting tool development trends in the construction and building fields. System specifications are determined based on needs analysis and benchmarking against available drone product specifications. Five alternative concepts were developed based on predetermined specifications. Concept selection was carried out using a scoring method against the reference design of the UAV-based ship exterior structure painting system. The drone concept with ultrasonic air assisted spraying was selected through a scoring method. Confirmed systems can produce solar paint coatings with high PCE, above 10%, based on a literature review. The system has a capacity of 10 liters of paint, a coating width of 4 - 15 cm, a painting range of more than 8 meters, and a continuous supply of electrical energy.

Keywords: System Design, Solar Paint, Drone, Ultrasonic Air Assisted