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ANALYTICAL HIERARCHY PROCESS APPROACH FOR BASIC COMPONENT AND SYSTEM INTEGRATION IN TACTICAL SURVEILLANCE UNMANNED AERIAL VEHICLES

(*Pendekatan Proses Hierarki Analitik untuk Integrasi Komponen Asas dan Sistem dalam Kenderaan Udara Tanpa Pengendali (UAV) Peninjauan Taktikal*)

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ABSTRACT

The purpose of the article is to analyze Unmanned Aerial Vehicle component weight, its impact on takeoff weight, and system development. Data was gathered through case studies, interviews, document reviews, and field observations at Company XYZ, supplemented by secondary sources. The Analytical Hierarchy Process (AHP) and Quality Function Deployment (QFD) guided component selection. UAV weight was reduced from 150kg to 120kg. The RONCZ1046 aerofoil was chosen for its aerodynamics, structural integrity, and manufacturability. Engine LMN was selected for its power, efficiency, and reliability. Flight tests and maintenance assessments validated UAV integration and performance. This research provides an insight into UAV weight optimization, design consideration and engine selection, supporting future advancements in UAV development.

Keywords: Unmanned Aerial Vehicles (UAVs); Analytical Hierarchy Process (AHP); Quality Function Deployment (QFD); aerofoil selection; engine integration

ABSTRAK

Tujuan artikel ini adalah untuk menganalisis berat komponen UAV, kesannya terhadap berat berlepas, dan pembangunan sistem. Data dikumpulkan melalui kajian kes, temu bual, semakan dokumen, dan pemerhatian lapangan di Syarikat XYZ, serta sumber sekunder. Proses Hierarki Analitik (AHP) dan Penempatan Fungsi Kualiti (QFD) digunakan untuk pemilihan komponen. Berat UAV dikurangkan daripada 150kg kepada 120kg. Aerofoil RONCZ1046 dipilih kerana kelebihan aerodinamik, keutuhan struktur, dan kebolehbuatannya. Enjin LMN dipilih berdasarkan kuasa, kecekapan, dan kebolehpercayaannya. Ujian penerbangan dan penilaian penyelenggaraan mengesahkan integrasi serta prestasi UAV. Kajian ini menyediakan penanda aras bagi pengoptimuman berat, reka bentuk, dan pemilihan enjin UAV, menyokong kemajuan masa depan dalam pembangunan UAV.

Kata kunci: Kenderaan Udara Tanpa Pemandu (UAV); Proses Hierarki Analitik (AHP); Penempatan Fungsi Kualiti (QFD); pemilihan aerofoil; integrasi enjin

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