

# **DESAIN AWAL DAN ANALISIS AERODINAMIKA UAV-C21 (KARGO)**

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## **ABSTRAK**

*UAV adalah pesawat yang terbang tanpa operator di dalamnya dan dapat terbang secara autonomous dengan mengolah data. Saat kondisi bencana alam kebutuhan para pengungsi sangat dibutuhkan dan untuk mendistribusikan saat terjadi bencana alam cukup sulit dikarenakan medan akibat bencana alam. Oleh karena itu peneliti merancang UAV yang dapat vertical takeoff dan landing (VTOL) guna membantu mendistribusikan kebutuhan para pengungsi.*

*Metode yang digunakan adalah metode analitik dan metode numerik dengan acuan dari buku Raymer. Dimana, proses perancangan dimulai dengan menentukan DR&O, menentukan berat, wing span, geometri sayap, fuselage dan tail. Hasil dari geometri digambar dalam bentuk 3 dimensi menggunakan software CATIA. Lalu hasil gambar 3 dimensi tersebut dianalisis untuk mengetahui karakteristik aerodinamika pada pesawat UAV menggunakan software ANSYS.*

*Hasil perancangan pesawat UAV VTOL menunjukkan bahwa pesawat memiliki bentuk sayap rectangular dengan posisi high wing, double tailboom, conventional tail, engine yang terpasang pusher dan 4 engine untuk melakukan vertical take off and landing di wing. Hasil analisis aerodinamika yang dilakukan pada hasil desain UAV C21 (Kargo) dengan kecepatan 33.3 m/s, pada sudut serang  $0^\circ$  diperoleh CL sebesar 0.38 dan  $CL_{max}$  sebesar 1.21 pada sudut  $10^\circ$ . Nilai dari CD pada saat sudut serang  $0^\circ$  sebesar 0.028 dan  $CD_{max}$  sebesar 0.15 pada sudut  $16^\circ$ .*

*Kata Kunci: UAV, Vertical Takeoff dan Landing, Perancangan, Aerodinamika, CFD, Bencana.*

# INITIAL DESIGN AND AERODYNAMIC ANALYSIS

## UAV-C21 (CARGO)

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### ABSTRACT

*UAV is an aircraft that flies without an operator in it and can fly autonomously by processing data. During a natural disaster, the needs of the refugees are urgently needed and to distribute it when a natural disaster occurs is quite difficult due to the terrain due to the natural disaster. Therefore, researchers designed a UAV that can vertical takeoff and landing (VTOL) to help distribute the needs of the refugees.*

*The method used is analytical method and numerical method with reference from Raymer's book. Where, the design process begins with determining DR&O, determining weight, wing span, wing geometry, fuselage and tail. The results of the geometry are drawn in 3 dimensions using CATIA software. Then the results of the 3-dimensional image were analyzed to determine the aerodynamic characteristics of the UAV aircraft using ANSYS software.*

*The results of the UAV VTOL aircraft design show that the aircraft has a rectangular wing shape with a high wing position, double tailboom, conventional tail, an engine mounted on a pusher and 4 engines to perform vertical take off and landing on the wing. The results of aerodynamic analysis carried out on the design results of the UAV C21 (Cargo) with a speed of 33.3 m/s, at an angle of attack of  $0^\circ$  obtained CL of 0.38 and CLmax of 1.21 at an angle of  $10^\circ$ . The value of CD at  $0^\circ$  angle of attack is 0.028 and CDmax is 0.15 at  $16^\circ$  angle.*

*Keywords: UAV, Vertical Takeoff and Landing, Design, Aerodynamics, CFD, Disaster.*