

ANALISIS WEIGHT AND BALANCE UNTUK MENENTUKAN CENTER OF GRAVITY (CG) PADA PESAWAT UAV SKY KING

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“ABSTRAK”

Unmanned Aerial Vehicle (UAV) adalah pesawat udara tanpa awak yang dapat melakukan berbagai macam misi diantaranya untuk misi militer dan sipil (umum). Dalam misi militernya pesawat UAV dioperasikan untuk mengintai daerah musuh dan kondisi musuh, dan dalam misi sipil UAV dimanfaatkan untuk bidang pertanian, perkebunan, dan pencarian korban bencana. Kelebihan dari pesawat UAV adalah memiliki biaya operasional yang rendah dan tidak mudah terlacak radar. Adapun tujuan dari penelitian ini untuk menentukan alur perhitungan weight and balance, menentukan center of gravity dan perbandingan antara weight and balance hasil pemodelan software CATIA dengan weight and balance pesawat UAV Sky King.

Pesawat UAV Sky King merupakan pesawat fixed wing dengan karakter slow flyer, weight and balance pesawat tersebut dapat ditentukan dengan menentukan center of gravity (CG) pesawat. CG harus dijaga agar pesawat dapat seimbang (balance) baik dalam sumbu lateral maupun longitudinal. Dalam menghitung center of gravity (CG) pesawat UAV Sky King ditentukan berat, arm, dan momen tiap komponen dari pesawat tersebut, dan untuk mendapatkan data tersebut dapat dilakukan dengan observasi, studi literature, dan wawancara.

Setelah melalui perhitungan center of gravity, didapatkan nilai CG pada 3 buah kondisi yaitu pada aplikasi CATIA (tanpa servo), perhitungan manual (tanpa servo), dan perhitungan manual (dengan servo). Didapatkan nilai center of gravity pada aplikasi CATIA (tanpa servo) pada sumbu X = -484,888269 mm, sumbu Y = 0 mm, sumbu Z = -27,735797 mm. Didapatkan nilai center of gravity pada perhitungan manual (tanpa servo) pada sumbu X = -424,390909 mm, sumbu Y = 0 mm, sumbu Z = 10,326299 mm. Didapatkan nilai center of gravity pada perhitungan manual (dengan servo) pada sumbu X = -432,131777 mm, sumbu Y = 0 mm, sumbu Z = 11,472941mm. Didapatkan pula nilai error pada perhitungan antara perhitungan secara manual tanpa servo dan CATIA tanpa servo sebesar 0,124766% pada sumbu X, pada sumbu Y sebesar 0%, pada sumbu Z sebesar 1,372309%.

Kata Kunci: UAV, pusat massa, weight and balance, CATIA

WEIGHT AND BALANCE ANALYSIS TO DETERMINE THE CENTER OF GRAVITY AT UAV SKY KING AIRPLANE

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“ABSTRACT”

Unmanned Aerial Vehicle (UAV) is an unmanned vehicle aircraft that can carry out various missions including military and civilian (general) missions. In its military mission, UAV aircraft are operated to spy on enemy areas and enemy conditions, and in civilian missions, UAVs are used for agriculture, plantations and search for disaster victims. As for the purpose of this study to determine the flow of weight and balance, center of gravity calculation and comparison between center of gravity results from CATIA software with weight and balance UAV Sky King.

The UAV Sky King is a type of aircraft that used a fixed wing with the character of the slow flyer, weight and balance of the aircraft can be determined by determining the center of gravity (CG). Center of gravity (CG) must be maintained so that the aircraft can balance both the lateral and longitudinal axes. In calculating the center of gravity (CG), the Sky King UAV plane is determined by the weight, arm, and moment of each component of the aircraft, and to get the data can be done by observation, literature studies, and interviews.

After doing the calculation of weight and balance, the center of gravity will be calculated on three conditioned, by CATIA (without servo), direct calculation (without servo), and direct calculation (with servo). The center of gravity from CATIA (without servo) at X coordinate is -484,888269 mm, at Y coordinate is 0 mm, at Z coordinate is -27,735797 mm. The center of gravity at direct calculation (without servo) at X coordinate is -424,390909 mm, at Y coordinate is 0 mm, at Z coordinate is 10,326299 mm. The center of gravity from direct calculation (with servo) at X coordinate is -432,131777 mm, at Y coordinate is 0 mm, at Z coordinate is 11,472941mm. Also the error percentage from CATIA calculation and direct calculation on UAV without servo is 0,124766% at X coordinate, 0 % at Y, coordinate 1,372309% at Z coordinate.

Keyword: UAV, center of gravity, weight and balance, CATIA