

# **PENENTUAN WEIGHT AND BALANCE UNTUK MENENTUKAN CENTER OF GRAVITY PADA PESAWAT UAV V-SKY14**

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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 center of gravity hasil pemodelan software CATIA dengan center of gravity pesawat UAV V-SKY14.*

*Pesawat UAV V-SKY14 merupakan pesawat fixed wing, 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 V-SKY14 ditentukan berat, arm, dan momen tiap part dari pesawat tersebut, dan untuk mendapatkan data tersebut dapat dilakukan dengan observasi, studi literatur, dan wawancara.*

*Setelah melalui perhitungan center of gravity, didapatkan nilai CG pada 4 buah kondisi yaitu pada aplikasi CATIA Assembly, aplikasi CATIA by part (tanpa servo), perhitungan manual (tanpa servo), dan perhitungan manual (dengan servo). Didapatkan nilai center of gravity pada aplikasi CATIA by part (tanpa servo) pada sumbu X = 467,5666997 mm, sumbu Y = 0,019394256 mm, sumbu Z = 103,6086945 mm. Didapatkan nilai center of gravity pada perhitungan manual (tanpa servo) pada sumbu X = 456,4177546 mm, sumbu Y = 0 mm, sumbu Z = 103,7206266 mm. Didapatkan nilai center of gravity pada perhitungan manual (dengan servo) pada sumbu X = 504,7053364 mm, sumbu Y = -1,113689095 mm, sumbu Z = 101,624594 mm. Didapatkan pula nilai error pada perhitungan antara perhitungan secara manual tanpa servo dan CATIA by Part tanpa servo sebesar 0,0238% pada sumbu X, pada sumbu Y sebesar 1%, pada sumbu Z sebesar 0,0010%.*

### **Kata Kunci:**

**UAV, Weight And Balance, Center of Gravity, CATIA**

**DETERMINATION OF WEIGHT AND BALANCE TO DETERMINE THE  
CENTER OF GRAVITY AT UAV V-SKY14 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 center of gravity UAV V-SKY14 with direct calculation.*

*The UAV V-SKY14 is a type of aircraft that used a fixed wing, 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 V-SKY14 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 four conditioned, by CATIA Plane Assemble, by CATIA Plane Part (without servo), direct calculation (without servo), and direct calculation (with servo). The center of gravity from CATIA (without servo) at X coordinate is 467,5666997 mm, at Y coordinate is 0,019394256 mm, at Z coordinate is 103,6086945 mm. The center of gravity at direct calculation (without servo) at X coordinate is 456,4177546 mm, at Y coordinate is 0 mm, at Z coordinate is 103,7206266 mm. The center of gravity from direct calculation (with servo) at X coordinate is 504,7053364 mm, at Y coordinate is -1,113689095 mm, at Z coordinate is 101,624594 mm. Also the error percentage from CATIA by part calculation and direct calculation on UAV without servo is 0,0238% at X coordinate, 1% at Y, coordinate 0,0010% at Z coordinate.*

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