

Sheet1

Struts						
Wing Strut		Nose Strut		Aft Gear Strut		Spe
Diameter	0.255	Diameter	0.212	Diameter	0.17	234.667
Length	7.439	Length	0.614	Length	2.42	Air De
Horizontal Stabilizer Geometry						0.00237717
Wingspan		Wing Area		Airfoil	Mean Chord	Tempe
11.66	ft	39.798	Ft^2	NACA 0012	3.413207547	500.839
Midsection Span		Root Chord		Aspect Ratio		Pres
0	ft	4.209	ft	3.41614151464898		2116.23
Tapered Chord Span		Tapered End Chord		dC/db		Speed o
5.83	ft	2.463	ft	0.29948542	ft/ft	1116.45
Vertical Stabilizer Geometry						
Wingspan		Wing Area		Airfoil	Mean Chord	
4.97	ft	20.34	Ft^2	NACA 0012	4.092555332	
Midsection Span		Midsection Chord		Aspect Ratio		
0	ft	6.347	ft	1.21440019665683		
Tapered Chord Span		Tapered End Chord		dC/db		
2.485	ft	2.228	ft	1.657545272	ft/ft	
Wing Geometry						
Wingspan		Wing Area		Airfoil	Mean Chord	
36	ft	174	Ft^2	NACA 2412	4.833333333	
Midsection Span		Root Chord		Aspect Ratio		
16.89	ft	5.484	ft	7.44827586206897		
Tapered Chord Span		Tapered End Chord		dC/db		
9.74	ft	3.378	ft	0.216221766	ft/ft	
Fuselage Geometry						
L_f		d_f		Fineness Ratio		Height
24.389	ft	4.7843982	ft	5.09761082229695		4.77
S_Wet (Wing, Constant Chord Section)						
Span		Sectional Area S_net		Airfoil thickness		
6.471	ft	34.869	ft	0.12	%t	
Root Chord		Tip Chord		lambda		
5.484	ft	5.484	ft	1	ndim	
t_c_r		t_c_t		tau		
0.65808		0.65808		1	ndim	
Sub-term 1		Sub-term 2		Wetted Area		
1		1.03		143.66028	Ft^2	
S_Wet (Wing, Tapered Section)						
Span		Sectional Area S_net		Airfoil thickness		
9.717	ft	43.937	ft	0.12	%t	
Root Chord		Tip Chord		lambda		
5.484	ft	3.378	ft	0.615973742	ndim	
t_c_r		t_c_t		tau		
0.65808		0.40536		1	ndim	
Sub-term 1		Sub-term 2		Wetted Area		
1		1.03		181.02044	Ft^2	
Total Area						
Constant		Tapered End Chord		Fuselage Top		To
143.66028	Ft^2	181.02044	Ft^2	20.97	Ft^2	324.68072

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Wing CD Calculation				
R_Nf	R_wf	R_LS	cbar_w_exposed	
35949334.99	1.04	1.08	4.868173956	ft
R_Nw	c_f	C_D_0		
7175678.228	3.16E-03	0.007708423		
Starting Coeff	Int-Term	S ratio		
0.003546752	1.164736	1.865981149		

Component	C_D_0	Area	C_D_i (if any)	f	source	Notes
Wing	0.007708423	324.68072	0.004155756	1.341265547	Roskam 5.8	
Hor. Tail	0.001911292	75.91512	0	0.332564851	Roskam 5.8	C_D_i ignored
Ver. Tail	0.001219113	51.68334	0	0.212125716	Roskam 5.8	Treated as 0 li
Fuselage	0.004965717	230.66816	0	0.864034712	Roskam 5.19	Torenbeek, st
Wing Struts	0.5	3.79389	0	1.896945		
Pitot Tube	1	0.02	0	0.02	CD, area from	McCormick T4
Subtotal	0.02682147	174	0.004155756	4.666935825		
Interference Drag				0.466693583		10% of subtot
Cooling Drag				0.513362941		10% of total
Subtotal (W/O	0.032453979		0.004155756	5.646992349		
Aft Gear	0.31	0.746	0	0.23126	Torenbeek F-19	
Nose Gear	0.64	0.459	0	0.29376	Torenbeek F-19	
Total (Gear D	0.035471335	174	0.004155756	6.172012349		

Flight Conditions/Aircraft Parameters		
Speed	Altitude	Standard Empty Weight
ft/s	0 ft	1734 lbs
Density	Viscosity	Weight
slug/ft ³	3.78E-07	3100 lbs
Temperature	Mach No	
Rankine	0.210190335 M	
Pressure	Specific Ratio R _{air} (Eng Toolbox)	
psf	1.4	1717
Speed of Sound	Span Efficiency Factor	
ft/s	0.84	

Induced Drag/Lift Calculation		
q _{infty}	Aircraft Lift	C _{L_w}
65.45371299	3100 lbs	0.285803443 ndim
C _{D_i}	CL coeff	
0.004155756 ndim	0.1598324515	

Fuselage Drag				
Length of Nose		Base Wetted Area		Windsheild
5.346 ft		249.810163752		5.16 Ft ²
Total Base S		Wing Mounting Point		Tail Mounting (1 Side)
256.5181638 Ft ²		20.97 Ft ²		0.743 Ft ²
Rudder Mounting		Wing Strut Mounting		Total Wetted Area S _{Wet_f}
2.834 Ft ²		0.28 Ft ²		230.6681638 Ft ²
R _{wf}	R _{Nf}	C _f	Fin. Rat.	C _{D_0_f}
Width	1.04	35949334.99	2.46E-03	5.097610822
	3.769			0.004965716735345

S _{Wet} (Hor. Tail, Constant Chord Section)		
Span	Sectional Area S _{net}	Airfoil thickness
0 ft	0 ft	0.12 %t
Root Chord	Tip Chord	lambda
4.209 ft	2.463 ft	0.585174626 ndim
t _{c_r}	t _{c_t}	tau
0.50508	0.29556	1 ndim
Sub-term 1	Sub-term 2	Wetted Area
1	1.03	0 Ft ²
S _{Wet} (Hor. Tail, Tapered Section)		
Span	Sectional Area S _{net}	Airfoil thickness
5.83 ft	18.426 ft	0.12 %t
Root Chord	Tip Chord	lambda
4.209 ft	2.463 ft	0.585174626 ndim
t _{c_r}	t _{c_t}	tau
0.50508	0.29556	1 ndim
Sub-term 1	Sub-term 2	Wetted Area
1	1.03	75.91512 Ft ²

Total Area		
Area	Constant	Tapered End Chord
Ft ²	0 Ft ²	75.91512 Ft ²
		Fuselage Top
		0 Ft ²

1
ft wing
streamlined body
4.3, F4.7
al

Hor. Tail CD Calculation			
R_Nf	R_wf	R_LS	cbar_w_exposed
35949334.99ndim	1.04	1.08	3.413207547ft
R_Nw	c_f	C_D_0	
5031060.785ndim	3.35E-03ndim	0.001911292	
Starting Coeff	Int-Term	S ratio	
0.003761149	1.164736ndim	0.436293793	
S_Wet (Ver. Tail, Large Chord Section)			
Span	Sectional Area S_net		Airfoil thickness
0.877ft	6.663ft	0.12%t	
Root Chord	Tip Chord		lambda
9.357ft	4.886ft	0.522175911ndim	
t_c_r	t_c_t	tau	
1.12284	0.58632	1ndim	
Sub-term 1	Sub-term 2	Wetted Area	
1	1.03	13.72578Ft^2	
S_Wet (Ver. Tail, Small Chord Section)			
Span	Sectional Area S_net		Airfoil thickness
4.076ft	18.426ft	0.12%t	
Root Chord	Tip Chord		lambda
4.886ft	2.433ft	0.497953336ndim	
t_c_r	t_c_t	tau	
0.58632	0.29196	1ndim	
Sub-term 1	Sub-term 2	Wetted Area	
1	1.03	37.95756Ft^2	
Total Area			
Constant	Tapered End Chord		Fuselage Top
13.72578Ft^2	37.95756Ft^2		0Ft^2
Ver. Tail CD Calculation			
R_Nf	R_wf	R_LS	cbar_w_exposed
35949334.99ndim	1.04	1.08	5.0654149ft
R_Nw	c_f	C_D_0	
7466410.967ndim	3.14E-03ndim	0.001219113	
Starting Coeff	Int-Term	S ratio	
0.003523832	1.164736ndim	0.29703069	

Component	Re	C_D	S
Wing Strut	375869.4666	0.5	3.79389
Nose Strut	312487.5566	0.7	0.130168
Aft Strut	250579.6444	0.9	0.4114
Nose Wheel			
Aft Wheel			

Total	
75.91512	Ft^2

Total	
51.68334	Ft^2