



# Specifications – MATP

Dimensions & Areas		
Wing Span	ft	7.92
Wing Area	ft <sup>2</sup>	7.88
Wing Aspect Ratio		8.0
Tailplane Span	ft	2.9
Length Overall	ft	5.8
Height Overall	ft	1.2
Wetted Area	ft <sup>2</sup>	40.2
Elevator	ft <sup>2</sup>	1.1
Ailerons (total)	ft <sup>2</sup>	0.9
Rudders (total)	ft <sup>2</sup>	0.4
Horizontal Area (total)	ft <sup>2</sup>	1.9
Propeller Diameter	ft	1.9
Width Fuselage	ft	1.0
Payload Bay Length	ft	1.3
Payload Bay Width	ft	0.8
Payload Bay Height	ft	0.8
Payload Volume	ft <sup>3</sup>	0.8
Performance (typ)		
Loiter Altitude (nom AGL)	ft	500
Radius of Action	nm	1
Stall Speed (at SL)	ktas	23
Loiter Speed (nom)	ktas	25
Max Speed	ktas	50
Max Endurance	hr	1
Max Climb Rate (Max SL)	ft/min	1500
Max Altitude (ceiling)	ft	18,000
Max Sustained Turn Rate	deg/s	-
Max Instant Turn Rate	deg/s	-
Max Load Factor		6.0
Takeoff Run over 50 ft	ft	-
Landing Run over 50 ft	ft	-
Takeoff Run	ft	-
Landing Run	ft	-
Runway LCN/PCN		16

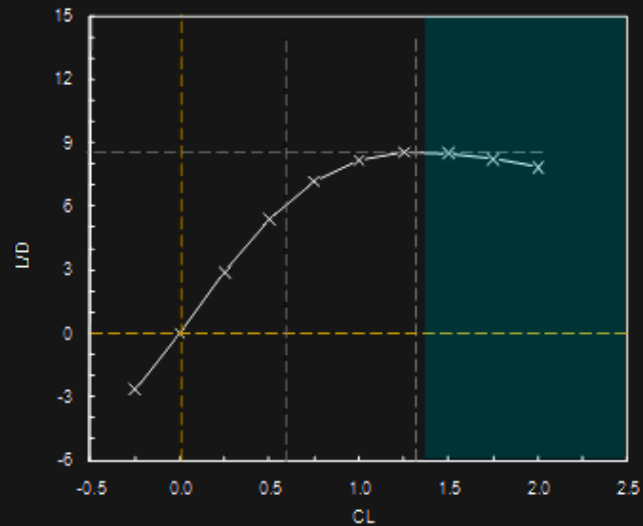
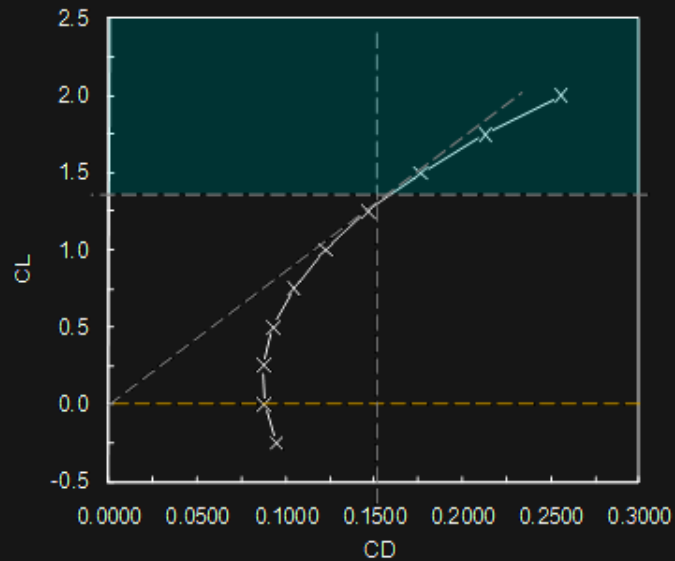
Weights & Loadings		
Empty Weight	lb	10
Pay Weight (typ)	lb	4
Fuel Weight (typ)	lb	5
Useful Load (max)	lb	9
Gross Weight (max)	lb	19
Wing Loading (TO)	lb/ft <sup>2</sup>	2.4
Thrust Loading (TO)	lb/hp	-
Power Draw (cont)	W	-
Limits	Units	Avg
Bank Angle	deg	15
Climb Rate	ft/min	1,500
Descent Rate	ft/min	1,500
Altitude	ft (ASL)	18,000
Speed	kt	50
Roll Rate	deg/sec	-
Pitch Rate	deg/sec	-



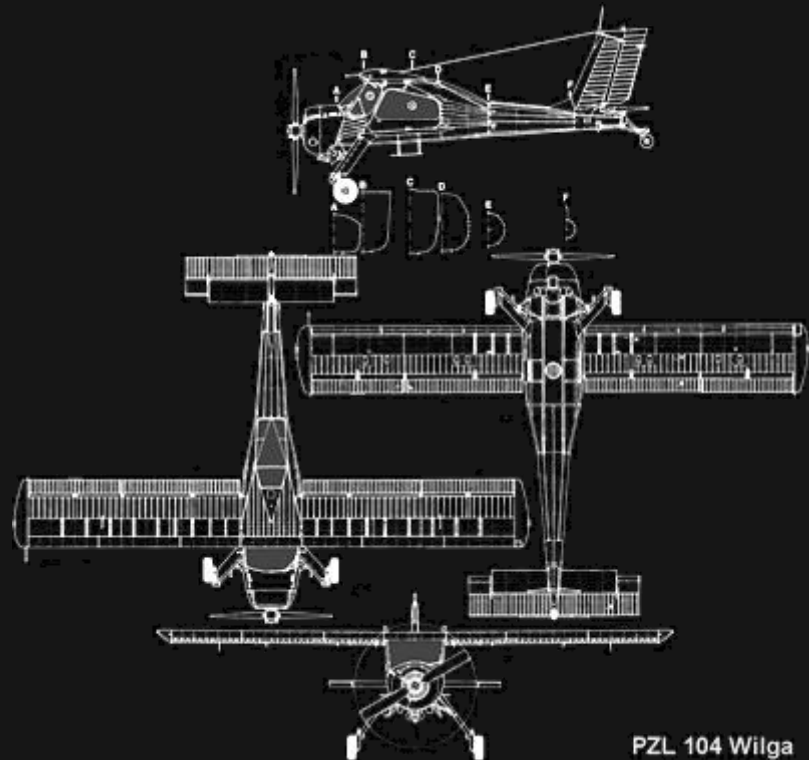
# Aerodynamics: Drag Polar



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Component Breakdown			
	Drag Area	Drag	Fraction
	$CD \cdot S = D/q$	lb	
Wing	0.161	0.353	25.4%
Winglets	0.000	0.000	0.0%
Fuselage	0.121	0.266	19.1%
Horizontal	0.028	0.062	4.5%
Vertical	0.037	0.082	5.9%
Nacelles/Pods	0.000	0.000	0.0%
Protuberance	0.011	0.025	1.8%
Boattail	0.002	0.003	0.2%
Additional	0.168	0.367	26.4%
Interference	0.106	0.232	16.7%
<b>Total</b>	<b>0.635</b>	<b>1.390</b>	<b>100.0%</b>



PZL 104 Wilga

\* Assumes Cruise Speed = 26 ktas

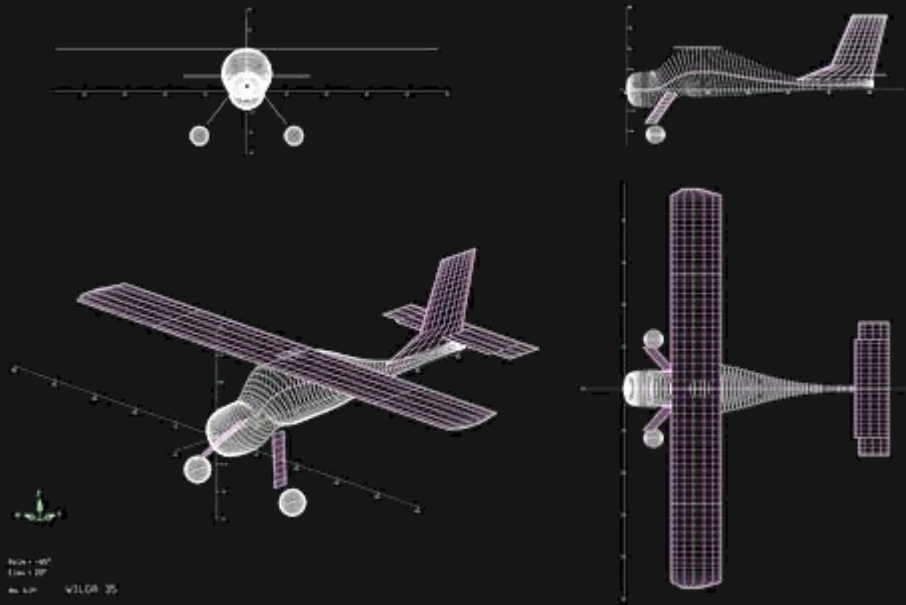
\*\* Based on 21.74% Scaling of PZL-104

\*\*\* <http://www.icare-rc.com/catalog/wilga-p-1496.html>

# AVL Vortex Lattice Model <sup>\*,\*\*</sup>



- Answer
  - Safe glide ratio of 9:1 with stall margin
  - Elevator throw range reasonable between  $\pm 20$  deg
- Assumption
  - No Flaps
  - CG at 13% static margin (fwd of  $\frac{1}{4}$  chord)
- Sensitivities
  - Parasitic drag may be double booked within VLM model
  - Wing airfoil selection could be refined (now lifting line)
- Alternatives
  - Flight test

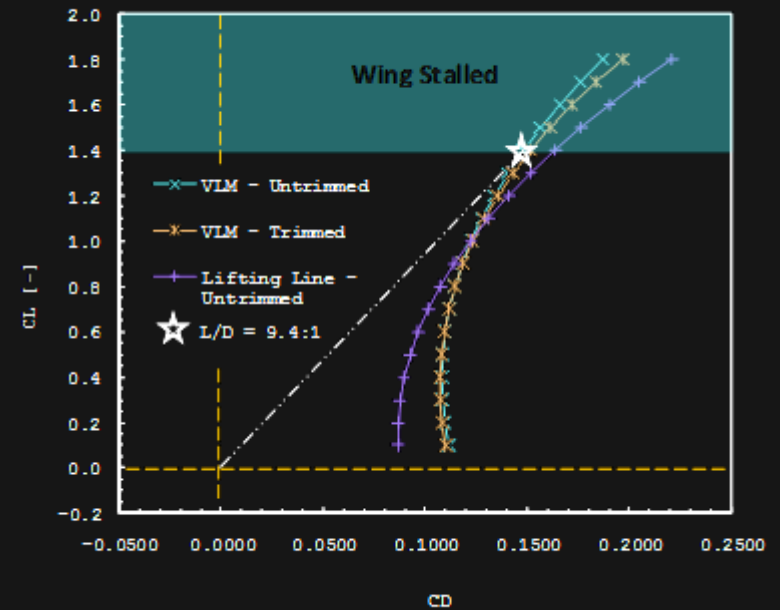


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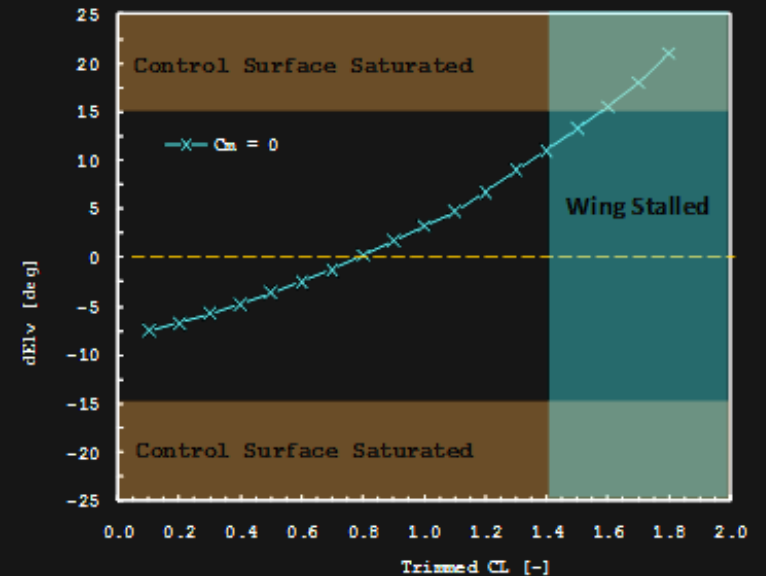
\* Assumes Cruise Speed = 26 ktas

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Drag Polar - No Flaps

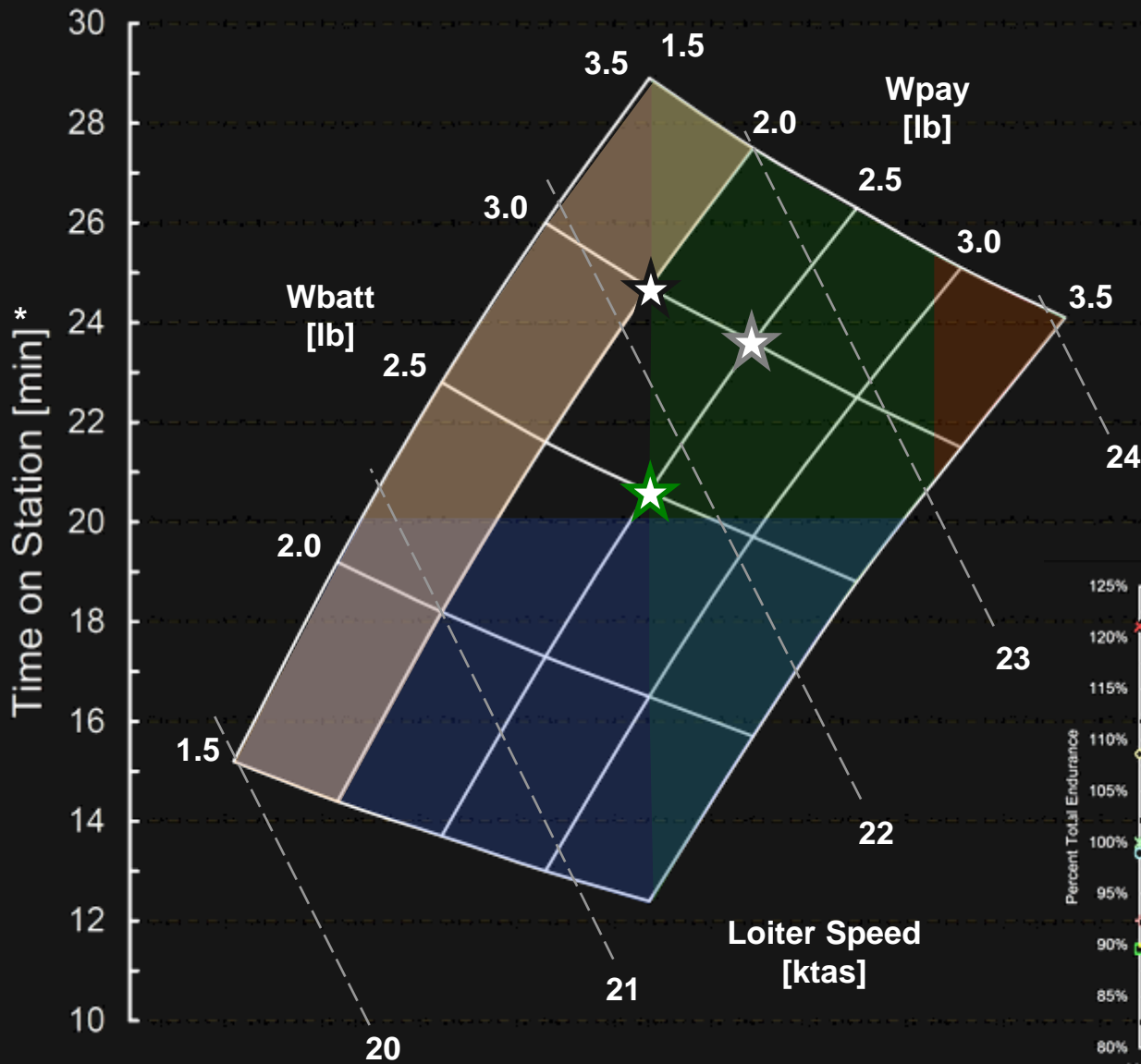


Elevator Deflection - No Flaps





# Trade Space & Sensitivities - Time on Station



**Constraint**

- 20 min TOS
- 100% DH III KE
- 75% DH III KE
- W pay > 2 lb

★ Baseline  
 ★ TOS Growth  
 ★ Payload Growth

\* Assumes 3 min Climb and 3 min Dash into Head Winds

