



SPORT CAMPER
Technical Report
Model: LoCamp

Report N°: 57-003
Rev: 1
Date: Feb. 2009

FLIGHT ENVELOPE

57-003

Prepared by

Maria Antoneta COTEA



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References

1. F 2245-04-06 Standard Specifications for Design and Performance of a Light Sport Airplane
2. 57-001 –Aerodynamics Characteristics Calculation
3. CS-VLA-PART C-

Location of the file: ftp.aerolab.biz/Release/57-003_R1.doc

Abbreviations

C_{L+}	maximum positive lift coefficient of airplane
C_{L-}	maximum negative lift coefficient of airplane
C_{Lmax}	maximum positive lift coefficient of airplane with maximum extended flap
Kias	indicated air speed- knot
n	load factor
n_{+flap}	load factor with flap deflected
V	speed
V_A	design maneuvering speed
V_{AO}	flaps extended design maneuvering speed
V_C	design cruising speed
V_D	design diving speed
V_F	design flap speed
V_{FE}	maximum flap extended speed
V_H	maximum speed in level flight with maximum continuous power
V_{NE}	never exceed speed
V_S	stalling speed or minimum steady flight at which the airplane is controllable
V_{SPOZ}	stalling speed for maximum positive lift
V_{SNEG}	stalling speed for maximum negative lift
V_{S0}	stalling speed for maximum flap deflection
Ude	derived gust velocity



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1. General

This report is dealing with the calculation of Flight Envelope of aircraft LoCamp 600kg according to requirements of chapter 5 of Ref. 1.

The Flight Envelope was built under Ref.1 5.2.3 and Ref.3 SUBPART C 337 requirement and for 600kg and 450 kg.

Design Airspeeds are done according to paragraph 5.2.4 of Ref.1 335 and .

Limit maneuvering load factors are:

$$n=4 \quad \text{and} \quad n=-2$$

Gust load factors are calculated under the Ref.1 15.2.6 and Ref.3 SUBPART C 333 requirement and are calculated by method of Appendix X3 and of Ref.3 SUBPART C 341.

Design speed $V_D=128$ knot is also the PROJECT SPEED and was chosen under the Ref.1 5.2.4.4 and Ref.3 SUBPART C 335(b)(2) requirement.

2. Conclusions

The aircraft LoCamp has in flight a good behavior.



3. Flight Envelope 600kg

Maximum weight [kg]	600
Minimum weight [kg]	450
Wing Span b [m]	9.1
Mean aerodynamic chord of wing MAC [m]	1.59
Aspect ratio	5.55
Wing area	14.9
Max. Wing loading (W_{MAX}) [kg/m ²]	40.24
Min. Wing loading (W_{min}) [kg/m ²]	30.18
C_{L+}	1.45
C_{L-}	0.96
C_{Lmax}	2.00
n_+	4
n_{+flap}	2
n_-	-2
g [m/s ²]	9.81
Density [kg/m ³]	1.225
Density [kg*s ² /m ⁴]	0.125
Lift Curve Slope $C_n\alpha$ of the A/C	4.467

3.2.33 Airspeed limitation

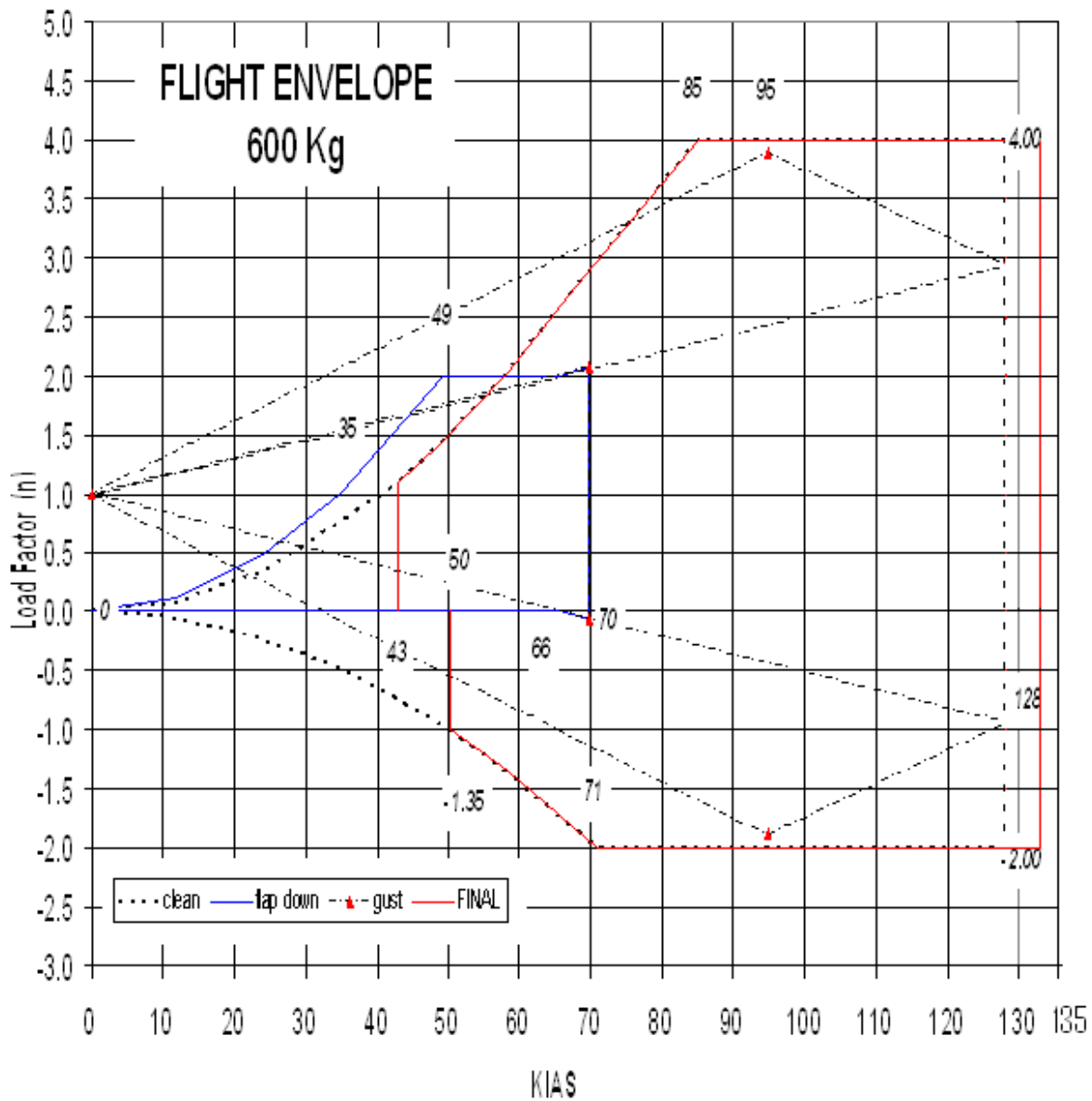
	[m/s]	[KIAS]	[km/h]
V_{NE}	59.2	115	213.0



5.2.4 Maximum weight			600
	[m/s]	[kias]	[km/h]
V_H	54.2	105.3	195.0
V_C	48.8	94.8	175.5
V_D	68.3	132.7	245.8
$V_{S_{pos_min}}$	21.1	41.0	76.0
$V_{S_{pos}}$	22.1	43.0	79.6
$V_{S_{neg}}$	25.9	50.3	93.1
V_{SO}	17.9	34.9	64.6
V_{Amin}	42.2	82.1	152.0
V_A	43.7	85.0	157.4
V_G	36.5	71.0	131.6

5.2.4.2. High lift devices			
	[m/s]	[kias]	km/h
V_{Fmin}	29.6	57.4	106.4
V_{FE}	35.9	69.8	129.2

5.2.6 Gust loads factors				
	Ude[ft/s]	Ude[m/s]	n	V[kias]
$V_C (+)$	50.00	15.25	3.88	94.8
$V_C (-)$	-50.00	-15.25	-1.88	94.8
$V_D (+)$	25.00	7.63	2.95	128.0
$V_D (-)$	-25.00	-7.63	-0.95	128.0
$V_F (+)$	25.00	7.63	2.06	69.8
$V_F (-)$	-25.00	-7.63	-0.06	69.8





4. Flight Envelope 450kg

5.2.4 Minimum Weight			450
	[m/s]	[kias]	[km/h]
V_H	54.2	105.3	195.0
V_{cmin}	42.2	82.1	152.0
V_{Cmax}	48.8	94.8	175.5
$V_{Dmax} [V_C]$	68.3	132.7	245.7
$V_{Dmin} [V_{Cmin}]$	59.1	114.9	212.8
V_D	65.8	128	237.1
$V_{S_{pos_min}}$	18.3	35.5	65.8
$V_{S_{pos}}$	19.5	38.0	70.4
$V_{S_{neg}}$	22.4	43.5	80.6
V_{S0}	15.5	30.2	56.0
V_{Amin}	36.6	71.1	131.6
V_A	38.6	75.0	138.9
V_G	31.7	61.5	113.9

5.2.4.2. High lift devices

	[m/s]	[kias]	km/h
V_{Fmin}	25.6	49.7	92.1
V_{FE}	31.1	60.4	111.9

5.2.6 Gust loads factors

	Ude[ft/s]	Ude[m/s]	n	V[kias]
$V_C (+)$	50.00	25.72	4.42	94.8
$V_C (-)$	-50.00	-25.72	-2.42	94.8
$V_D (+)$	25.00	12.86	3.31	128.0
$V_D (-)$	-25.00	-12.86	-1.31	128.0
$V_F (+)$	25.00	12.86	2.09	60.4
$V_F (-)$	-25.00	-12.86	-0.09	60.4

