An introduction to Tailless RC Sailplanes

Bill Kuhlman

An introduction to Tailless RC Sailplanes

Part 1: Planks

Part 2: Swept wings



Bill with (L) an R-2 and (R) a highly modified Raven MB. The R-2 spans 100”, the Raven 110”. Both of these are considered to be plank planforms.



The Vitesse, a sophisticated swept wing designed and built by Dave Camp and Glyn Fonteneau. Span is 134”, and features compound winglets.

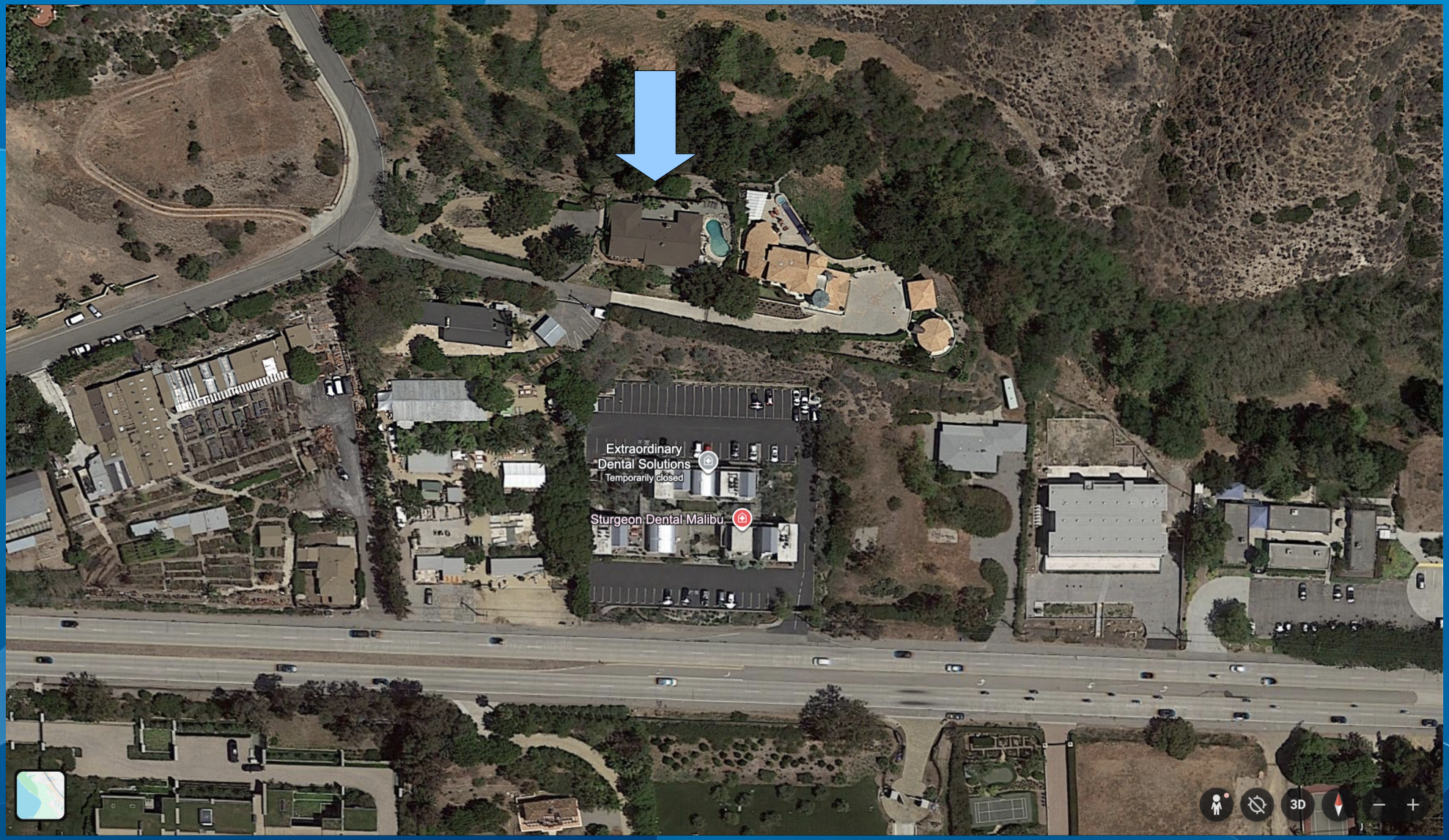
An introduction to Tailless RC Sailplanes

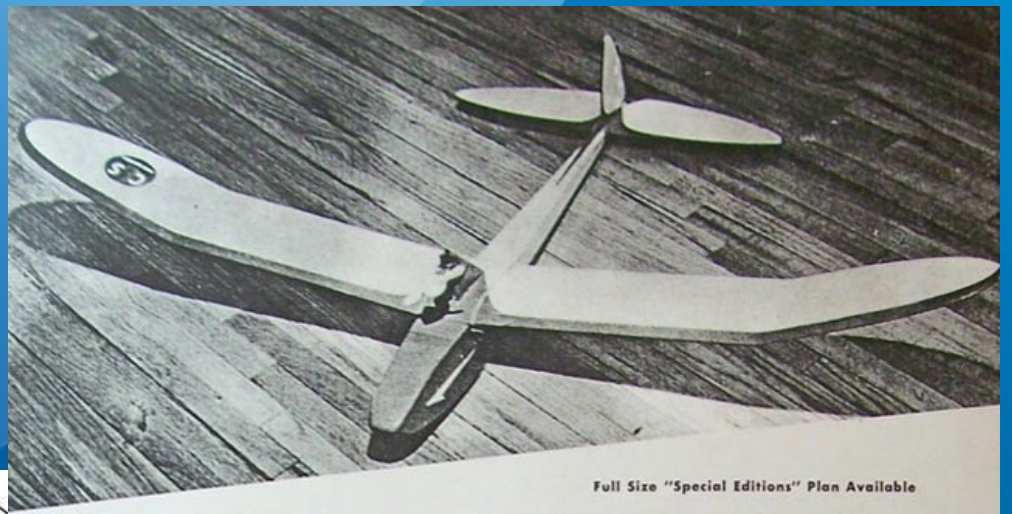
- Personal Introduction





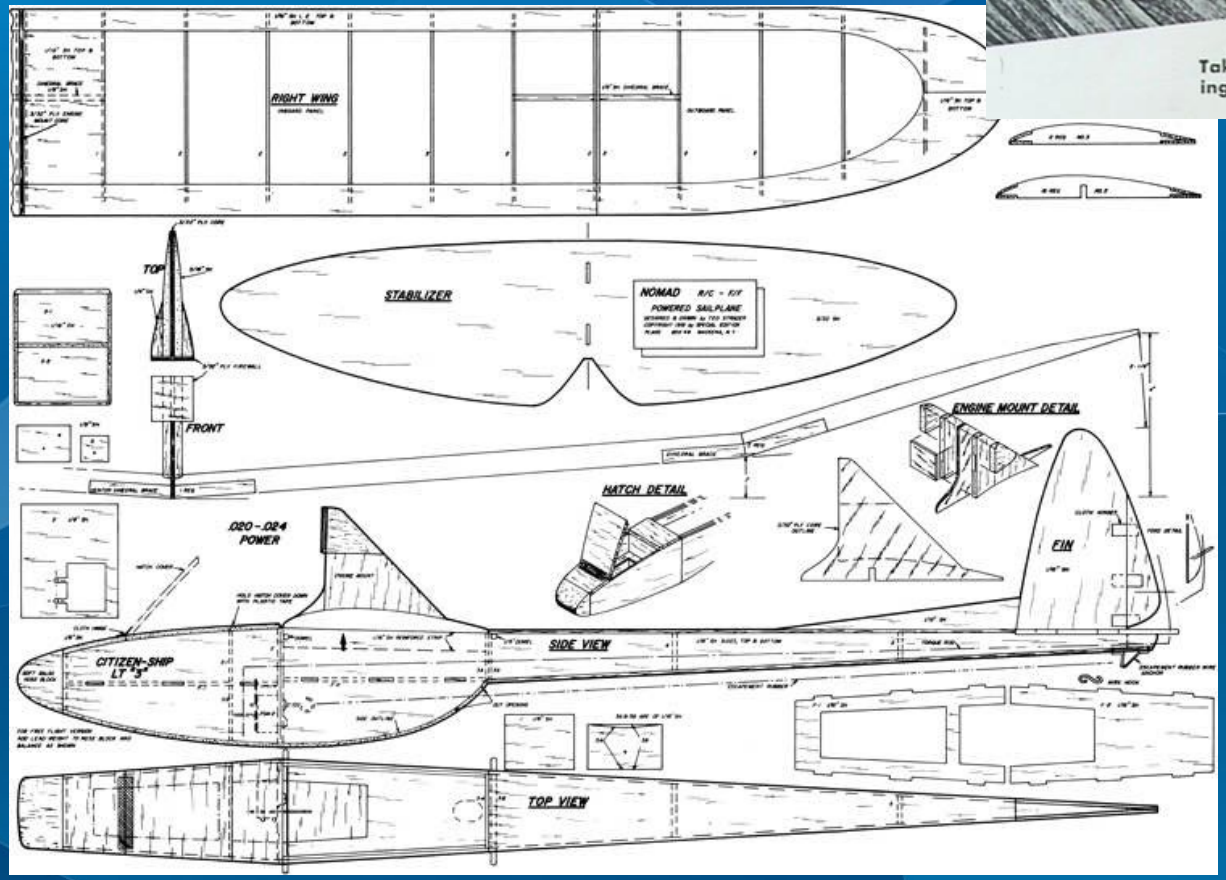
The Strato hand-launch glider and the rubber-powered Sleek Streak. Both of these were manufactured by North Pacific of Bend Oregon beginning in the early 1950s.

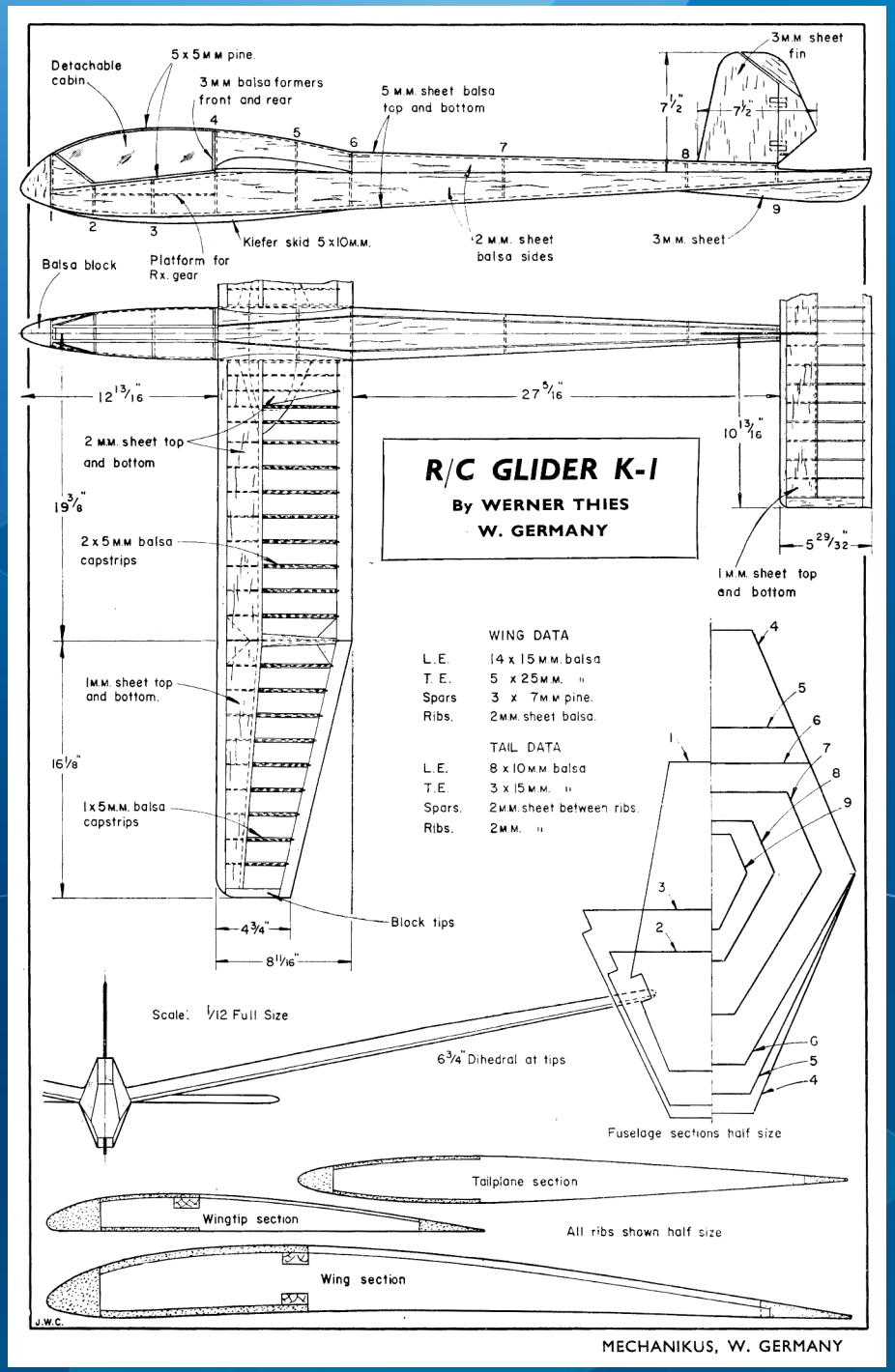

Extraordinary
Dental Solutions
Temporarily closed
Sturgeon Dental Malibu
3D



Full Size "Special Editions" Plan Available

Take a whack at R/C Soaring. "Nomad's" perfect for the job — with relaying receiver, 48" span, 9½ oz. Simple structure, a good beginners ship.

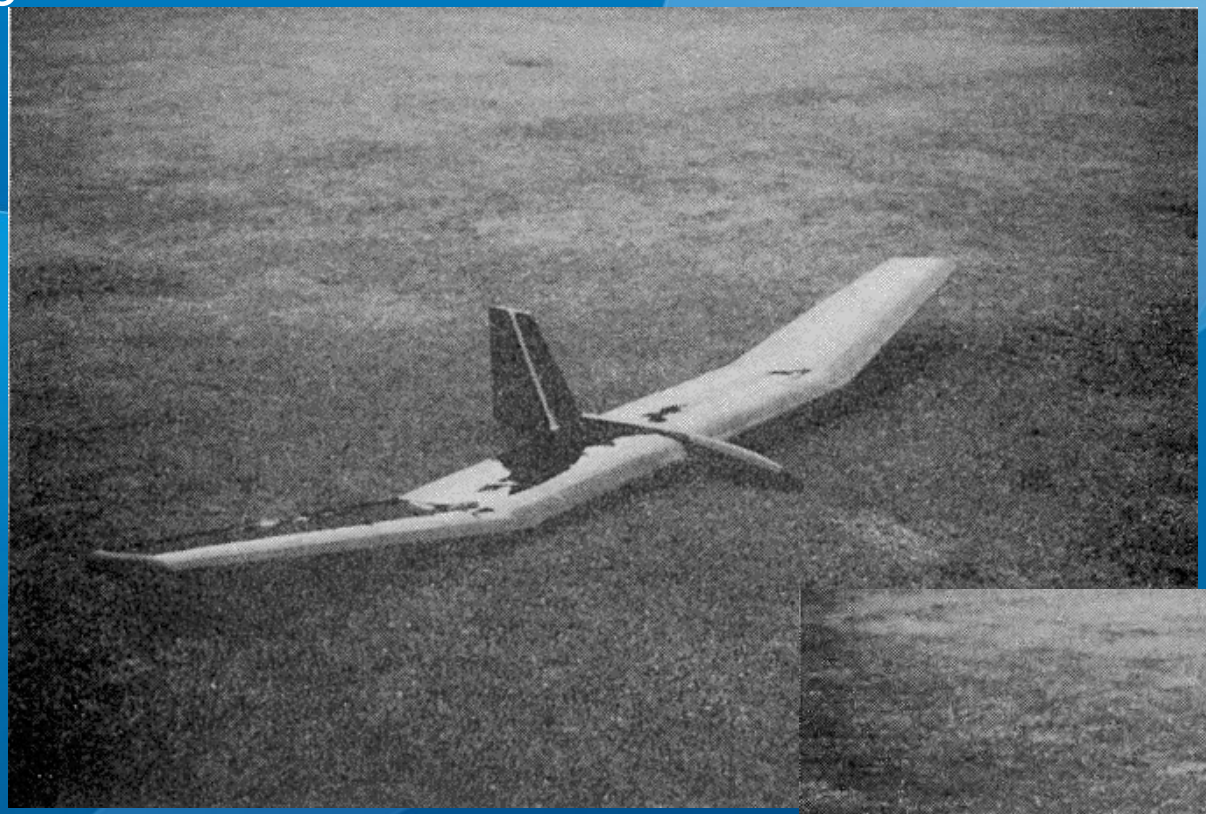




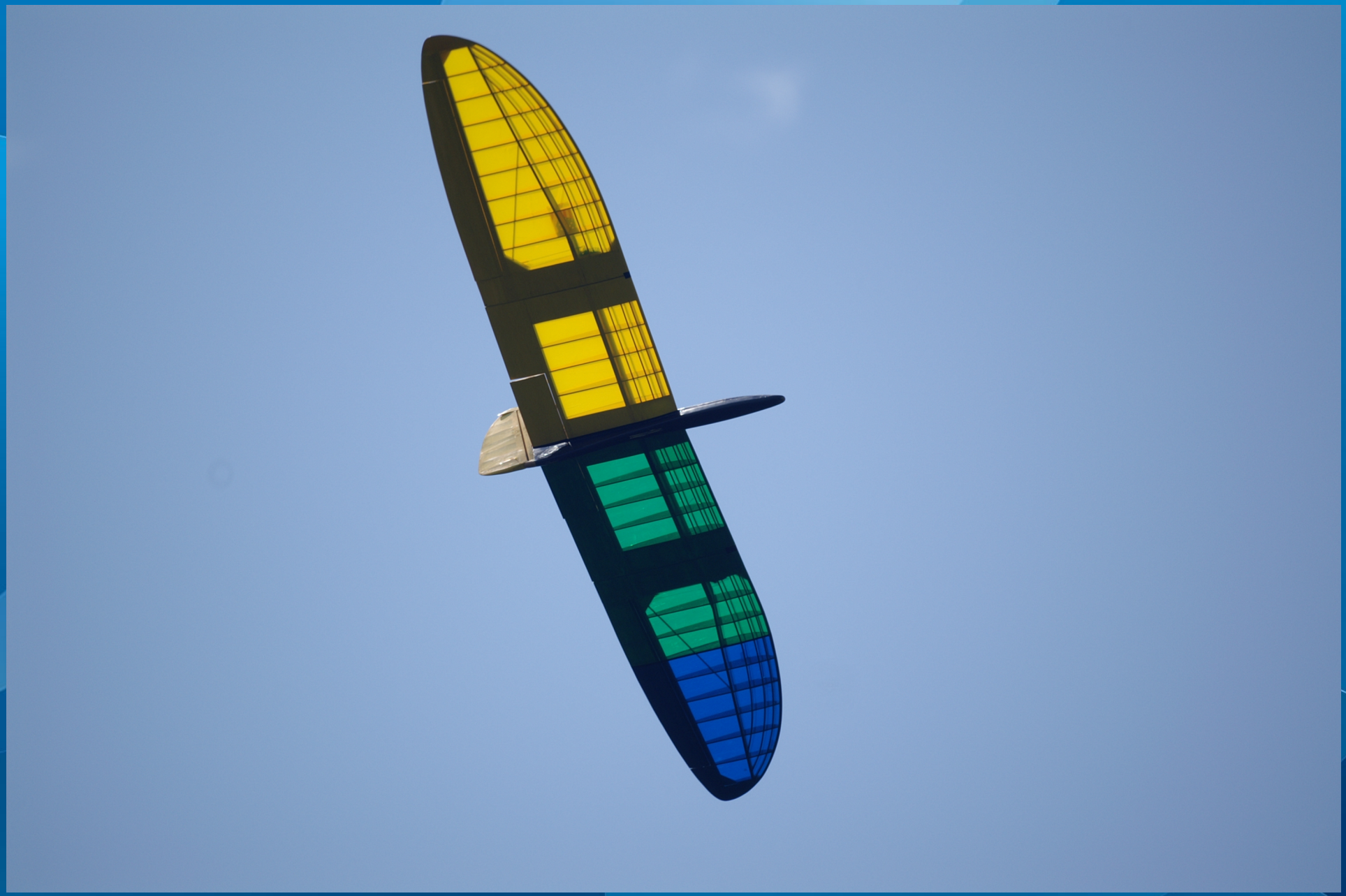
Aeromodeller Annual 1960 (-1961), p.78



Curt Weller and Elfe II





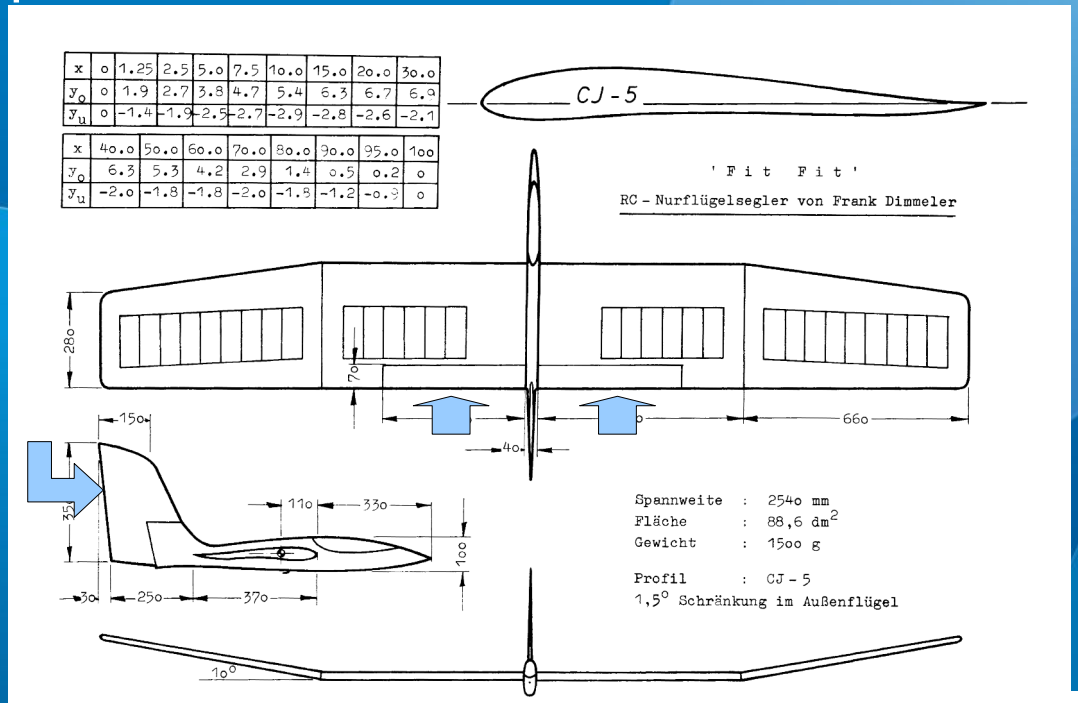


Part 1: Planks

- Section 1: Notes on Planks
- Section 2: How Planks Fly
- Section 3: Making Improvements

An introduction to Tailless RC Sailplanes

- Section 1: Notes on Planks

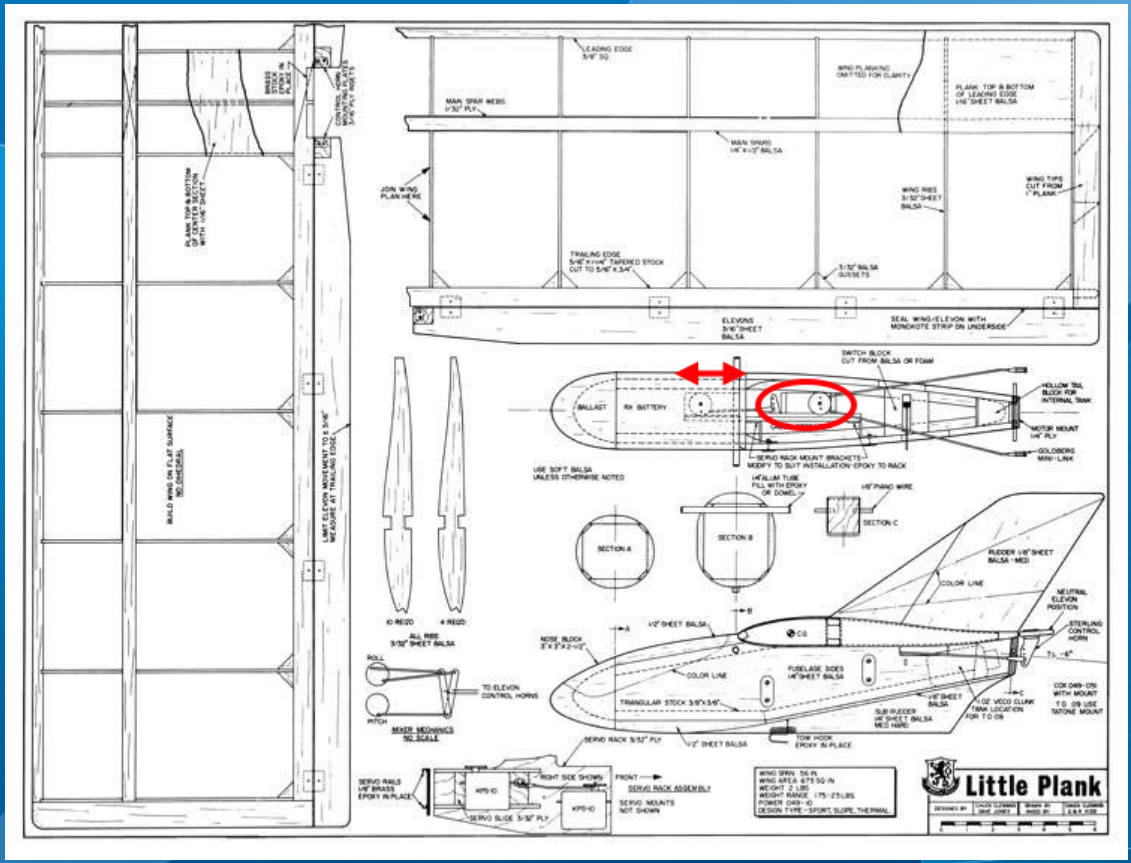


x	0	1.25	2.5	5.0	7.5	10.0	15.0	20.0	30.0
y_o	0	1.9	2.7	3.8	4.7	5.4	6.3	6.7	6.9
y_u	0	-1.4	-1.9	-2.5	-2.7	-2.9	-2.8	-2.6	-2.1

x	40.0	50.0	60.0	70.0	80.0	90.0	95.0	100
y_o	6.3	5.3	4.2	2.9	1.4	0.5	0.2	0
y_u	-2.0	-1.8	-1.8	-2.0	-1.8	-1.2	-0.3	0

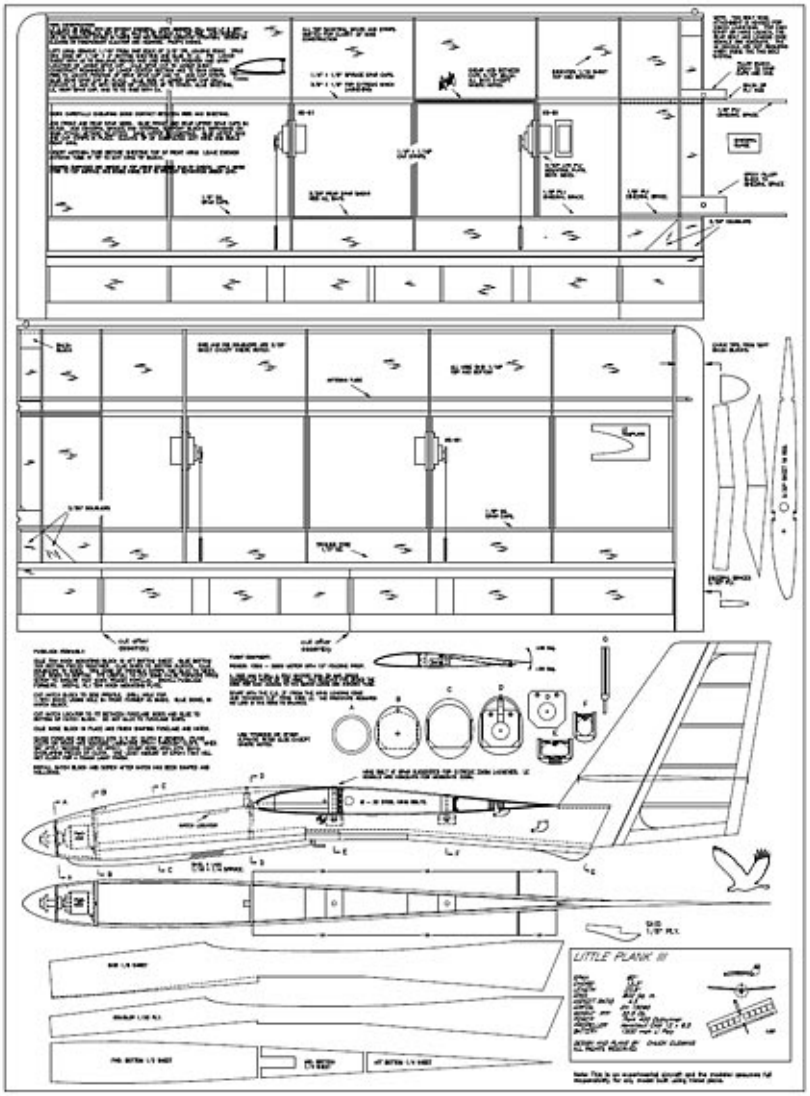


Fit Fit (circa 1984)
Frank Dimmeler





Chuck and the original Little Plank in 1971.





Chuck and Little Plank III 2013



Blackbird 2M with CJ2309 airfoil

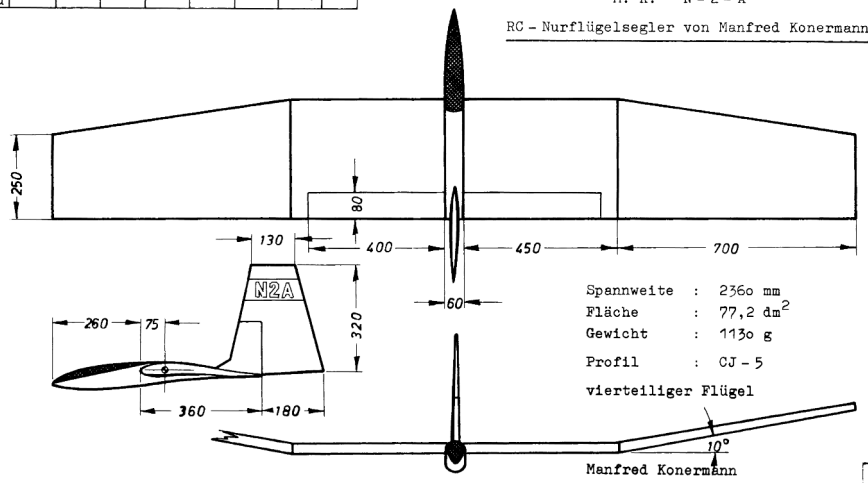
x	0	1.25	2.5	5.0	7.5	10.0	15.0	20.0	30.0
y_o	0	1.9	2.7	3.8	4.7	5.4	6.3	6.7	6.9
y_u	0	-1.4	-1.9	-2.5	-2.7	-2.9	-2.8	-2.6	-2.1

x	40.0	50.0	60.0	70.0	80.0	90.0	95.0	100
y_o	6.3	5.3	4.2	2.9	1.4	0.5	0.2	0
y_u	-2.0	-1.8	-1.8	-2.0	-1.8	-1.2	-0.9	0

CJ - 5

' M. K. N - 2 - A '

RC - Nurflügelsegler von Manfred Konermann



Spannweite : 2360 mm
Fläche : 77,2 dm²
Gewicht : 1130 g
Profil : CJ - 5
vierteiliger Flügel

Manfred Konermann
Rosengarten 68
4400 Münster / W.

MK N2A (circa 1982)
Manfred Konermann

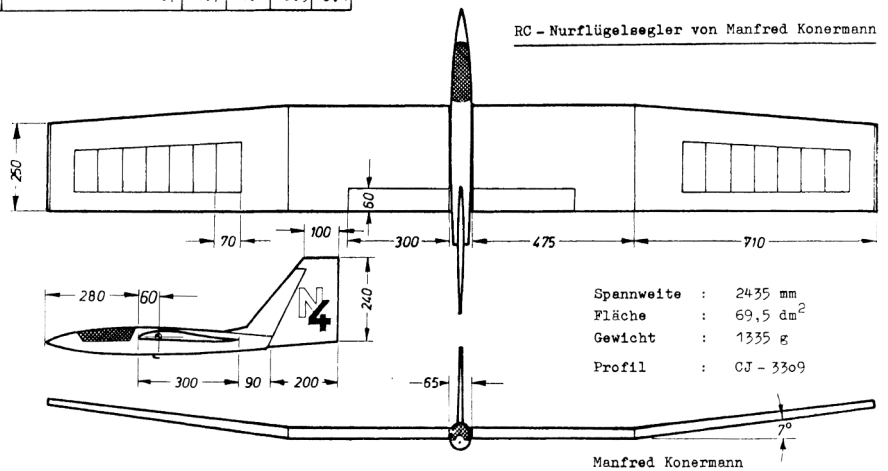
x	0	1.25	2.5	5.0	7.5	10.0	15.0	20.0	30.0
y_o	0	1.5	2.4	3.6	4.7	5.6	6.9	7.8	8.0
y_u	0	-1.0	-1.2	-1.2	----------				

x	40.0	50.0	60.0	70.0	80.0	90.0	95.0	100
y_o	7.2	5.7	4.0	2.5	1.1	0.3	0.1	0.1
y_u	----------			-1.7	-1.7	-1.4	-0.9	-0.1

CJ - 3309

' M. K. N - 4 '

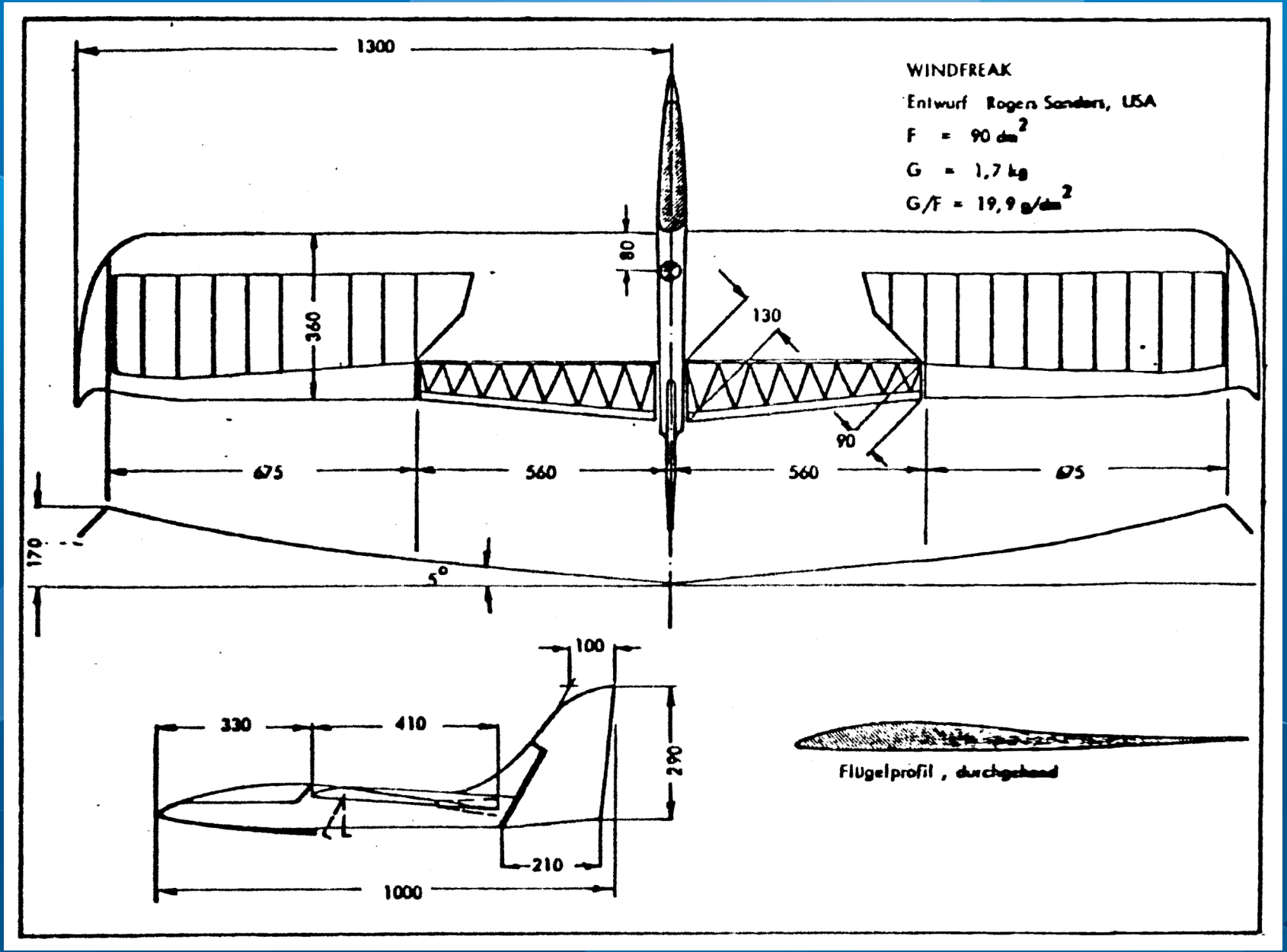
RC - Nurflügelsegler von Manfred Konermann



Spannweite : 2435 mm
Fläche : 69,5 dm²
Gewicht : 1335 g
Profil : CJ - 3309

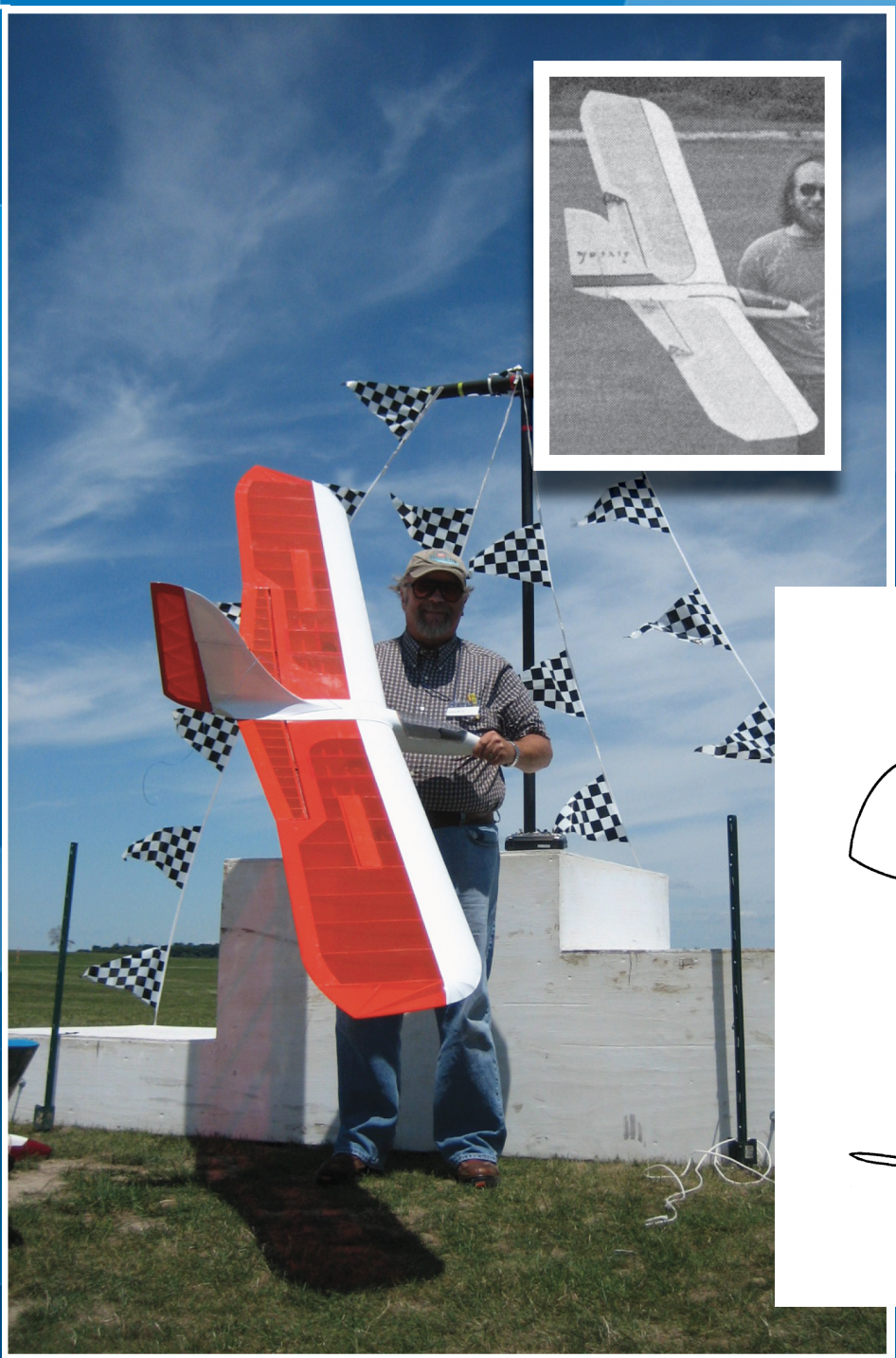
Manfred Konermann
Rosengarten 68
4400 Münster / W.

MK N4 (circa 1984)
Manfred Konermann

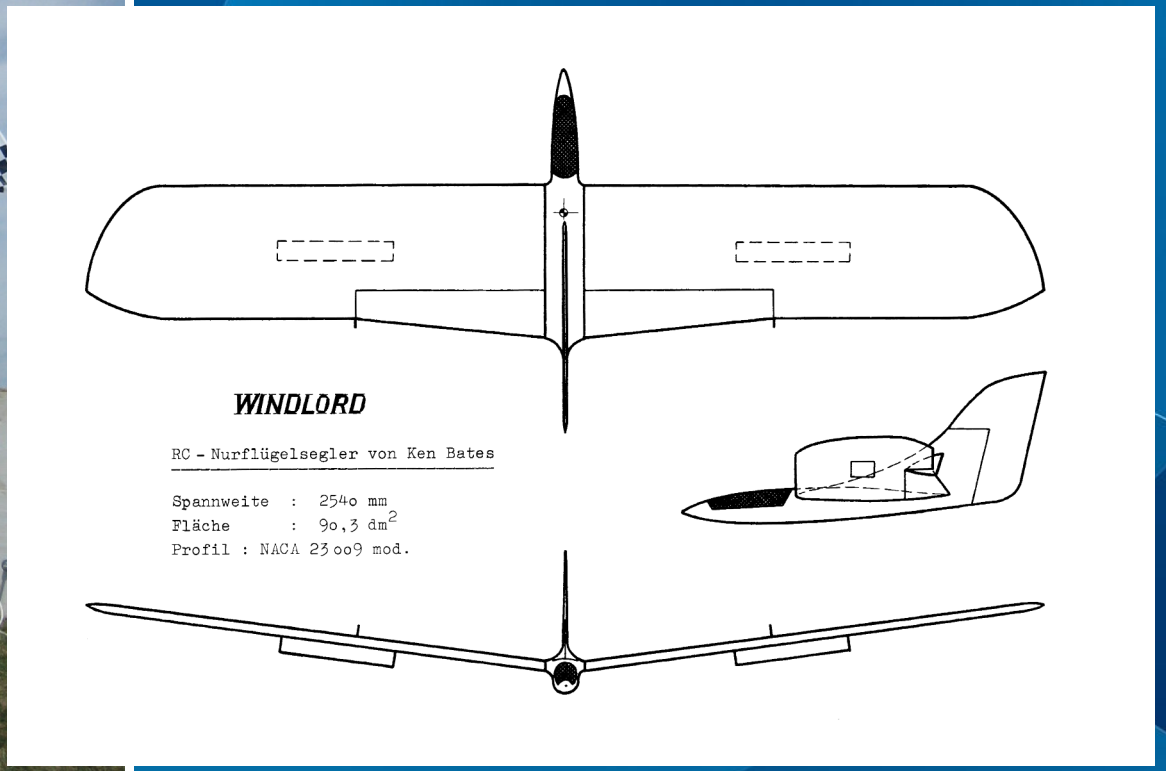

1300
WINDFREAK
Entwurf Rogers Sanders, USA
F = 90 dm²
G = 1,7 kg
G/F = 19,9 g/dm²
80
360
130
90
675
560
560
675
170
5°
100
330
410
290
210
1000
Flügelprofil, durchgehend

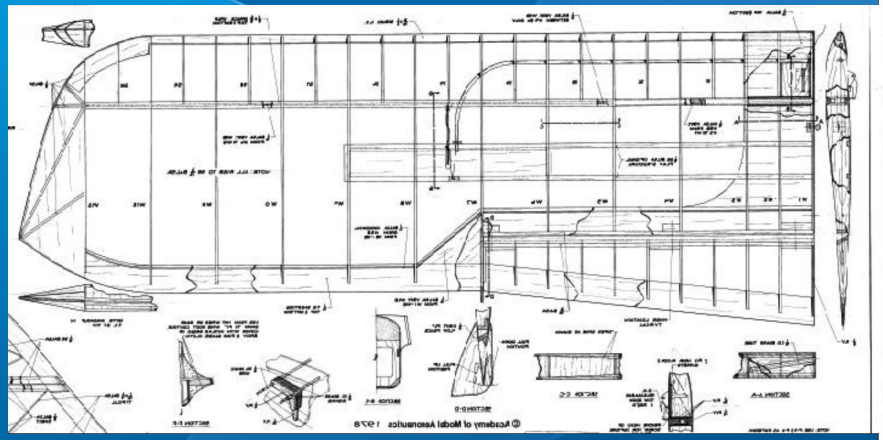


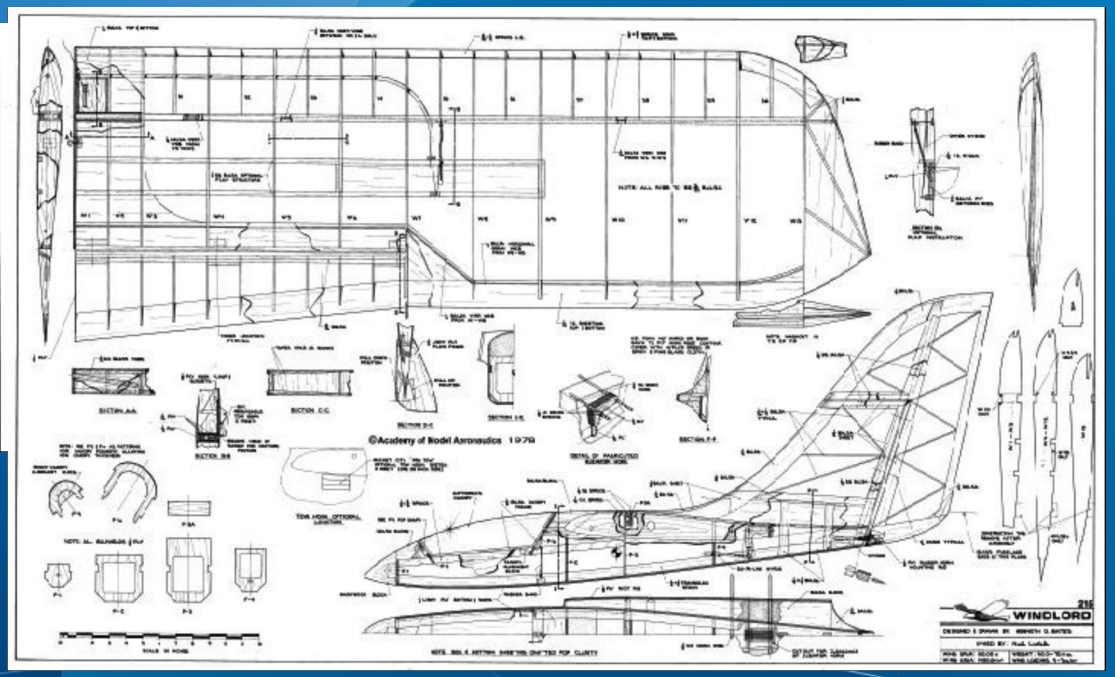
Roger Sanders' Windfreak



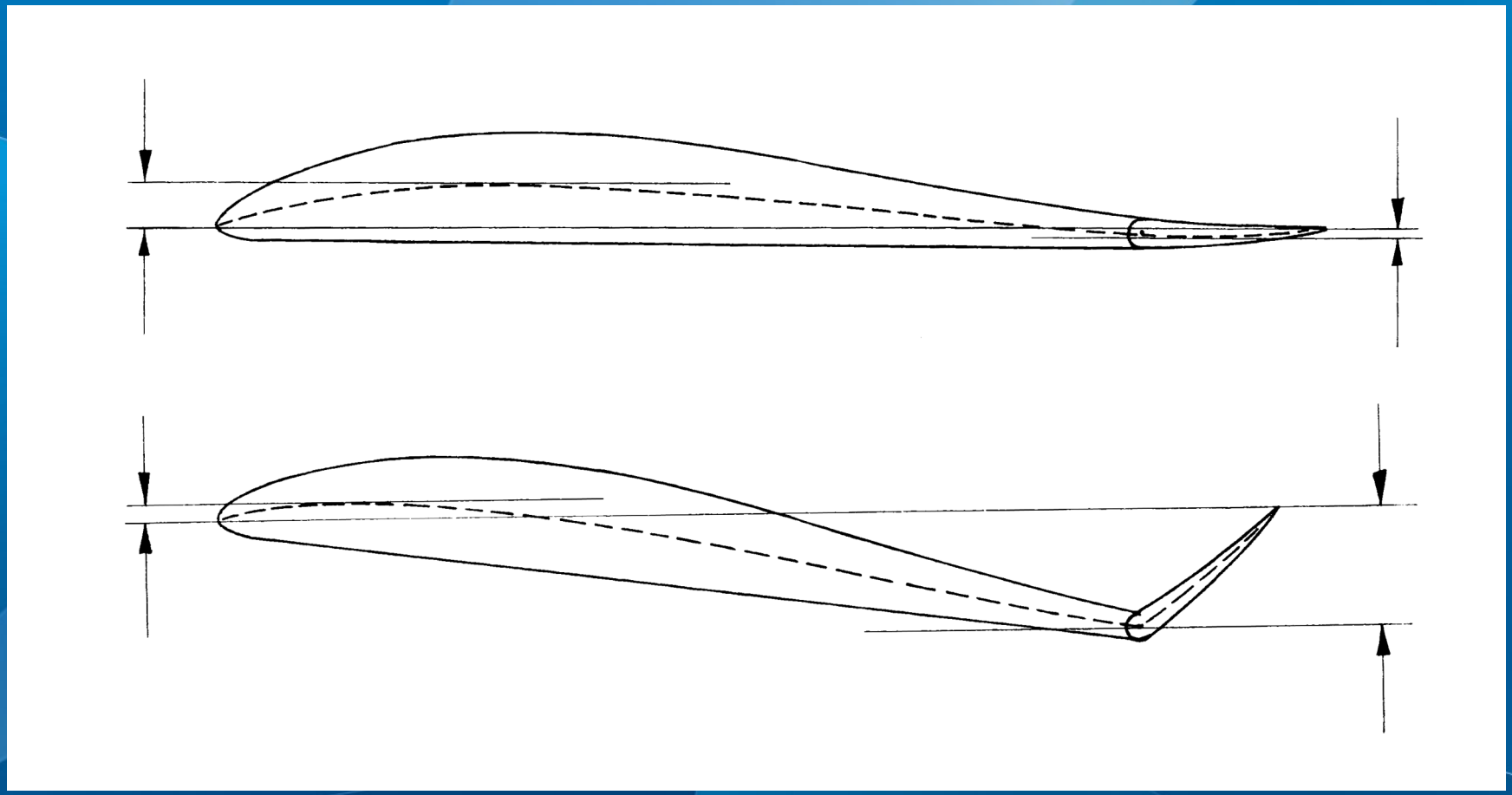
Windlord
Ken Bates
Model Aviation March 1978
AMA NATS 2007







Windlord
Ken Bates
Model Aviation March 1978

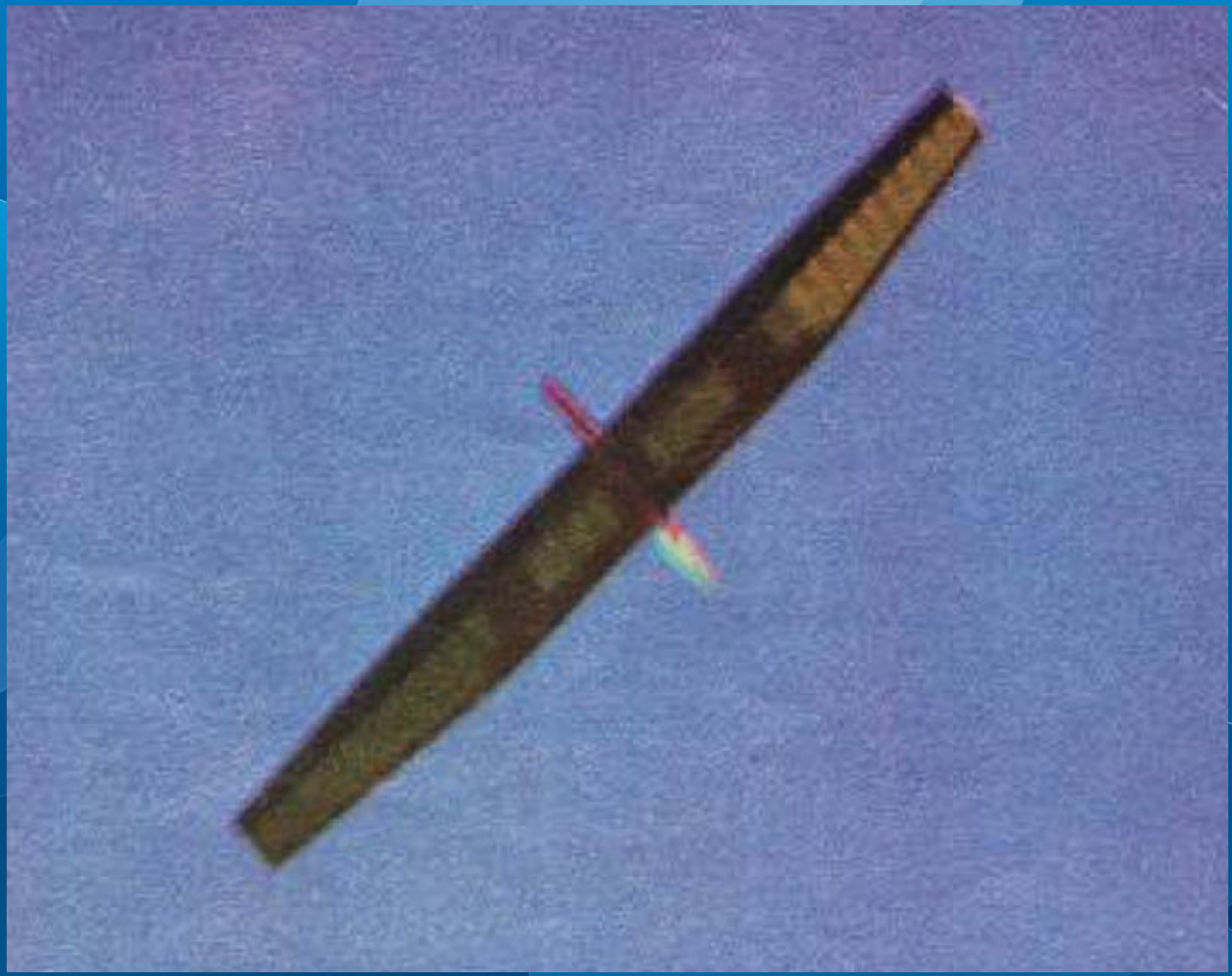


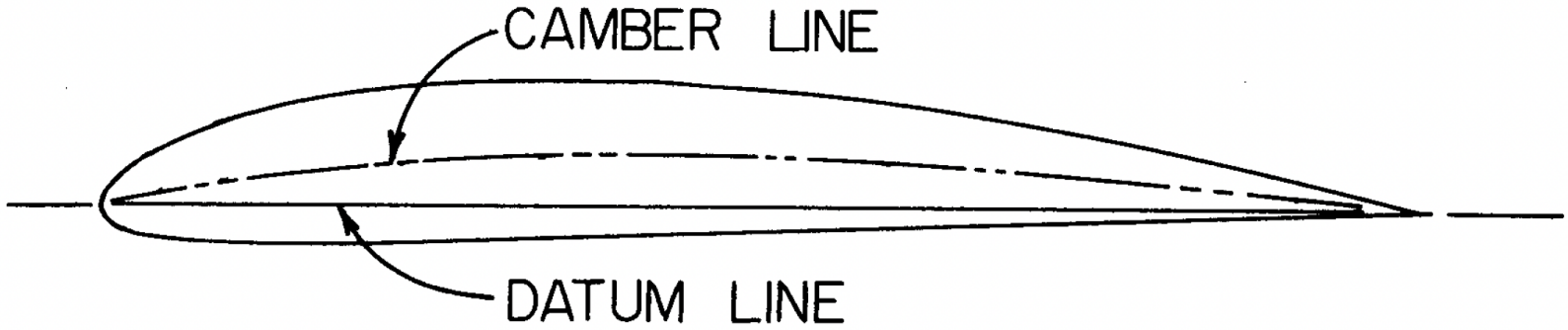


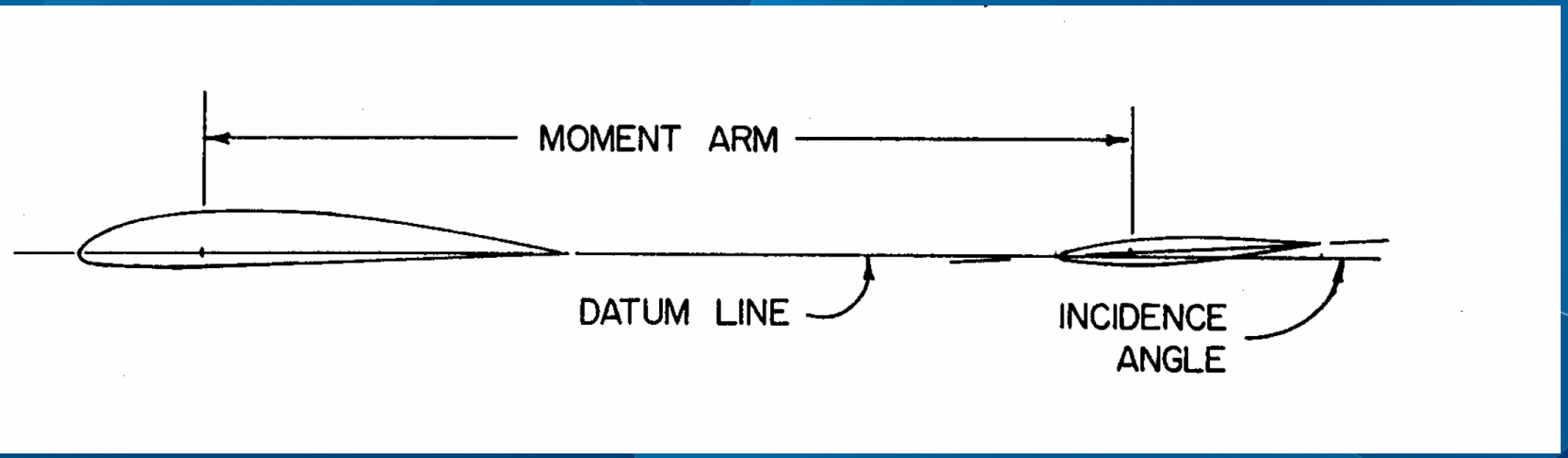
A Dave Jones designed Raven MB on winch tow.

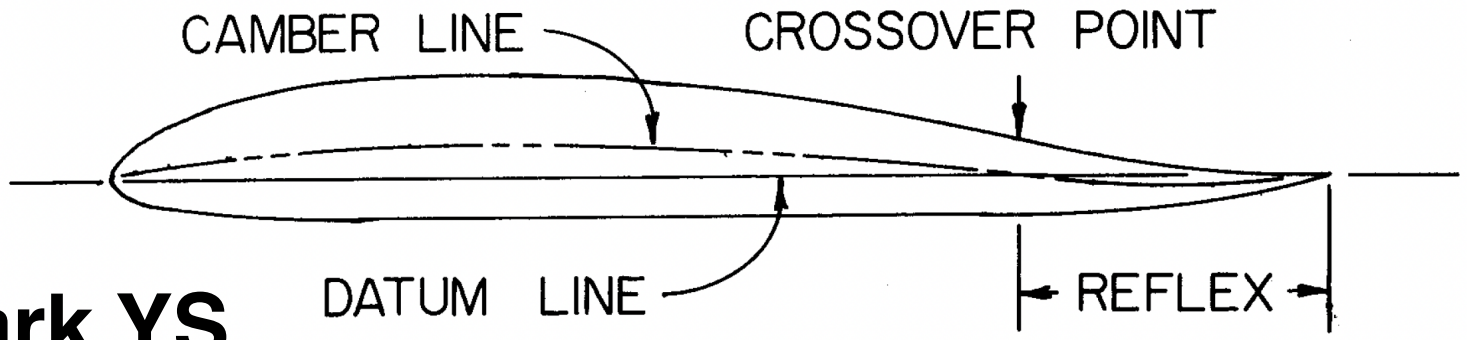
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- Section 2: How Planks Fly



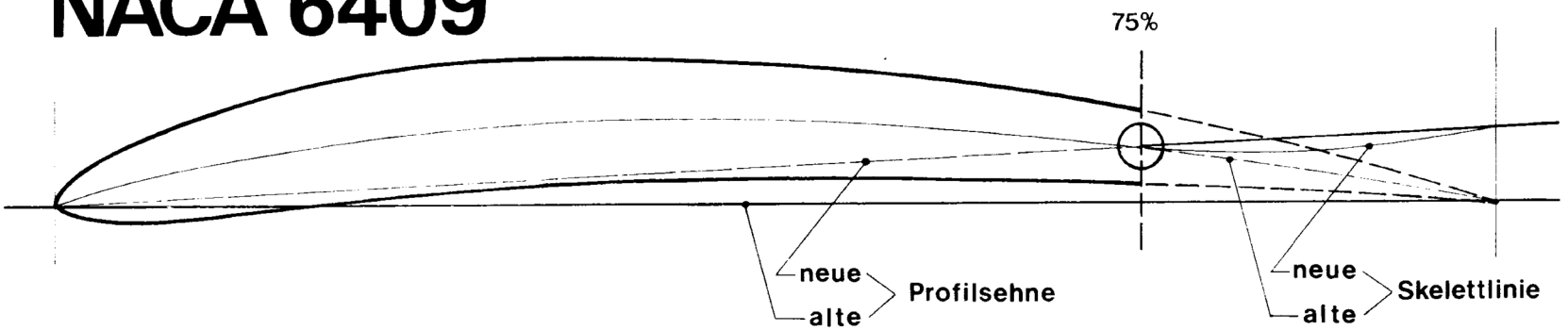

CAMBER LINE
DATUM LINE

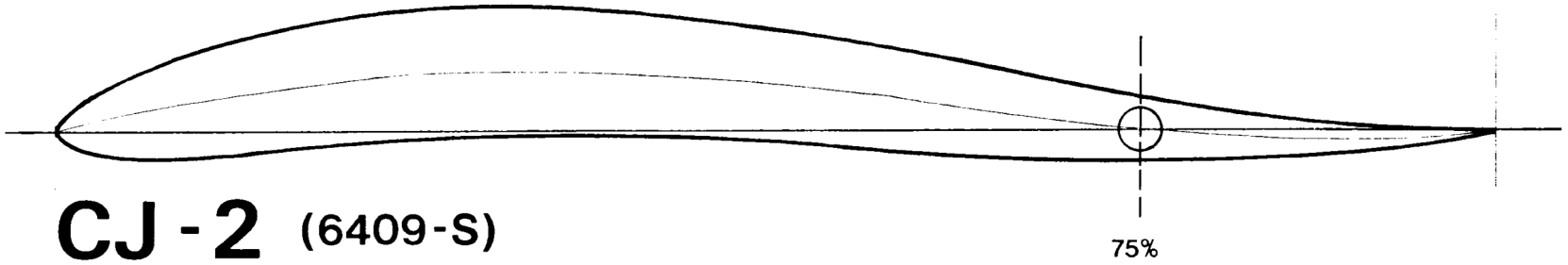

MOMENT ARM
DATUM LINE
INCIDENCE
ANGLE



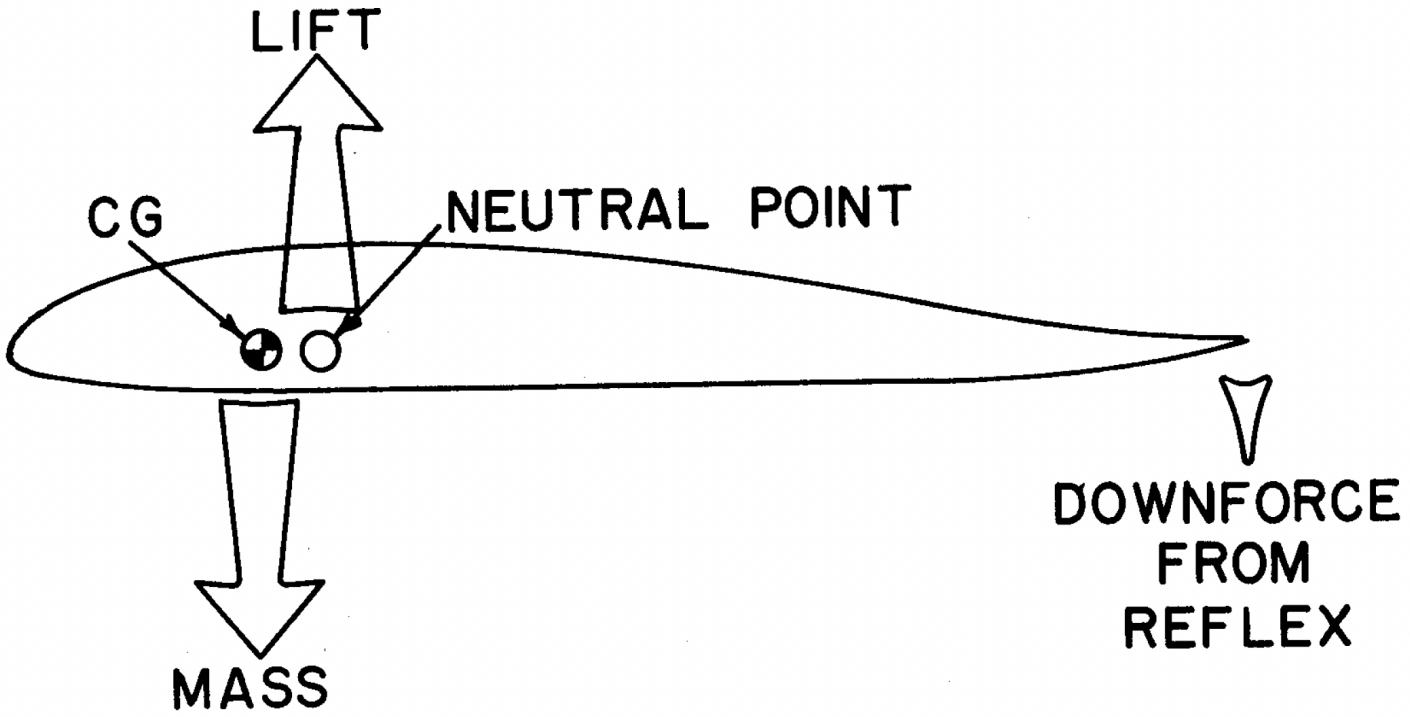
Clark YS

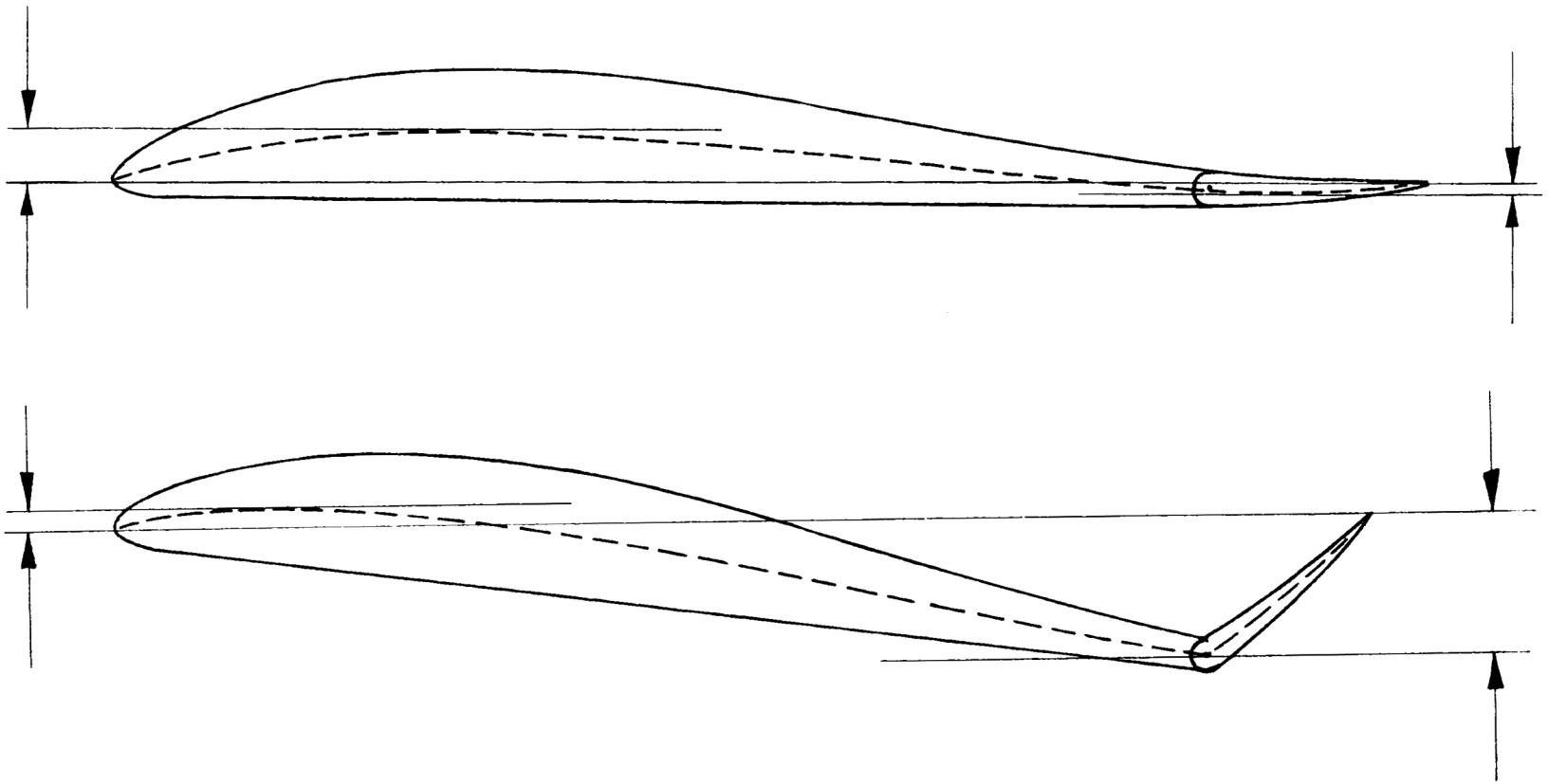
NACA 6409

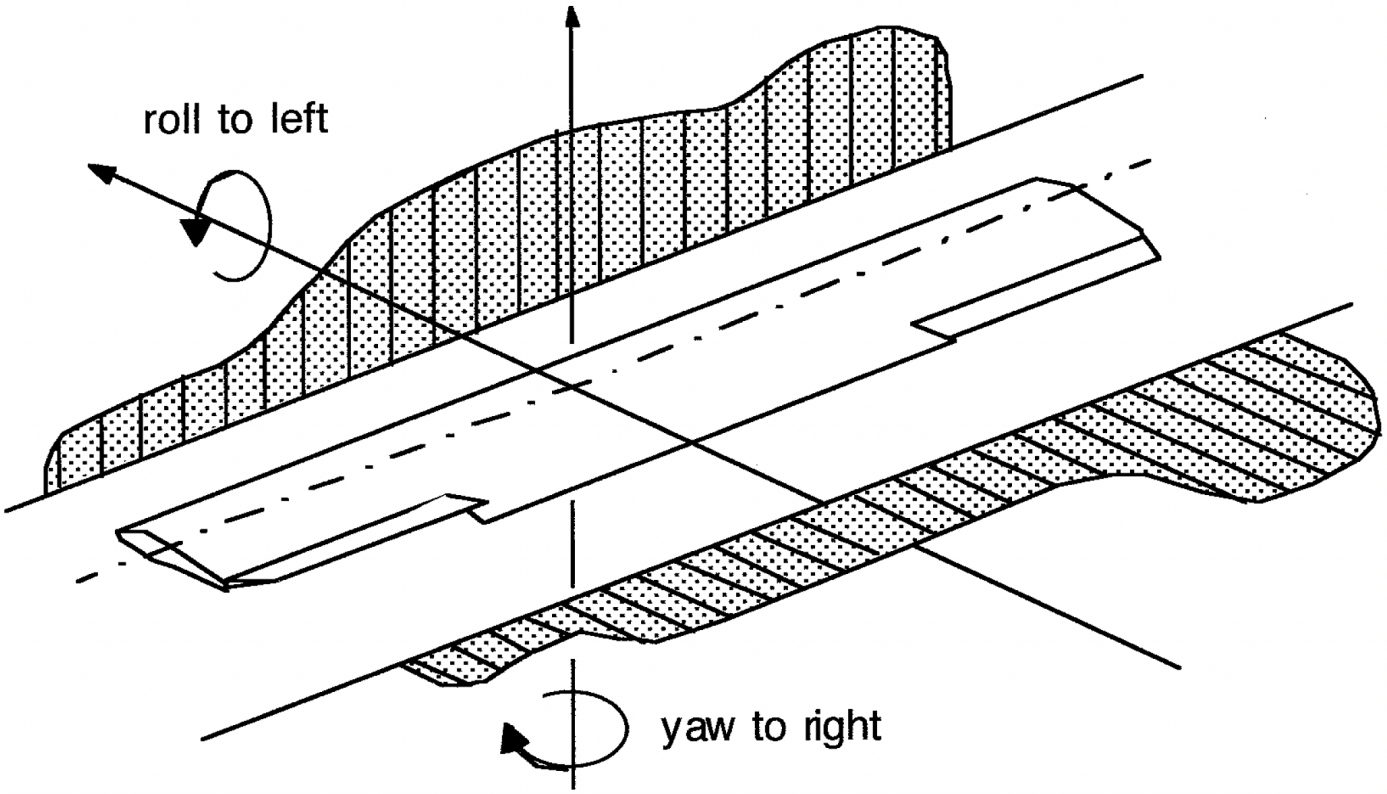




CJ-2 (6409-S)

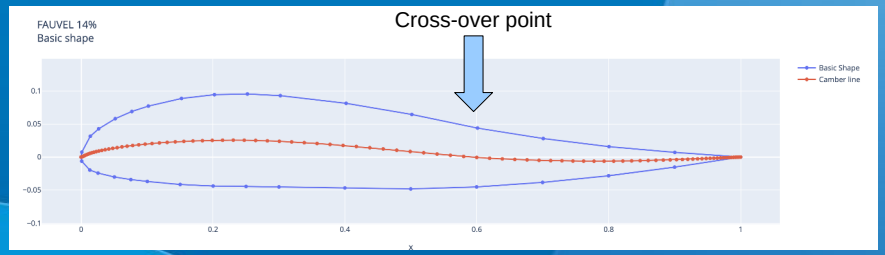

LIFT
CG
NEUTRAL POINT
DOWNFORCE
FROM
REFLEX
MASS



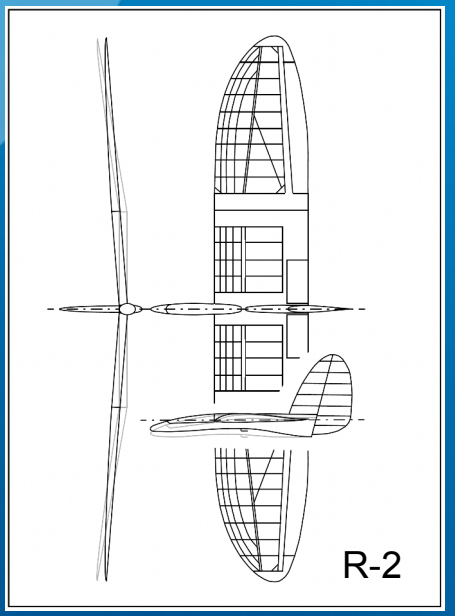

roll to left
yaw to right

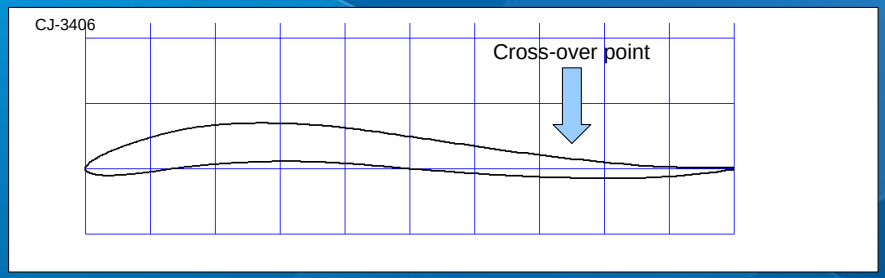
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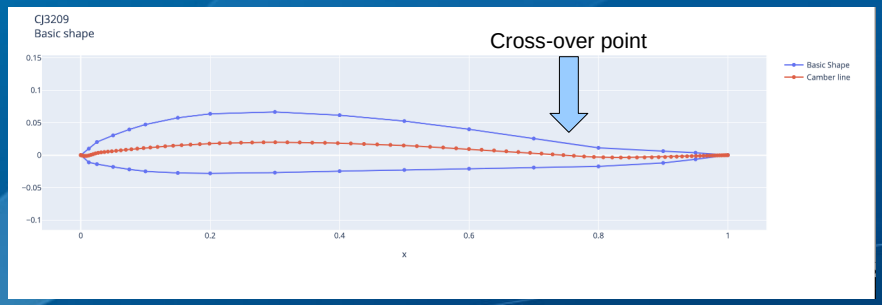
- Section 3: Making Improvements

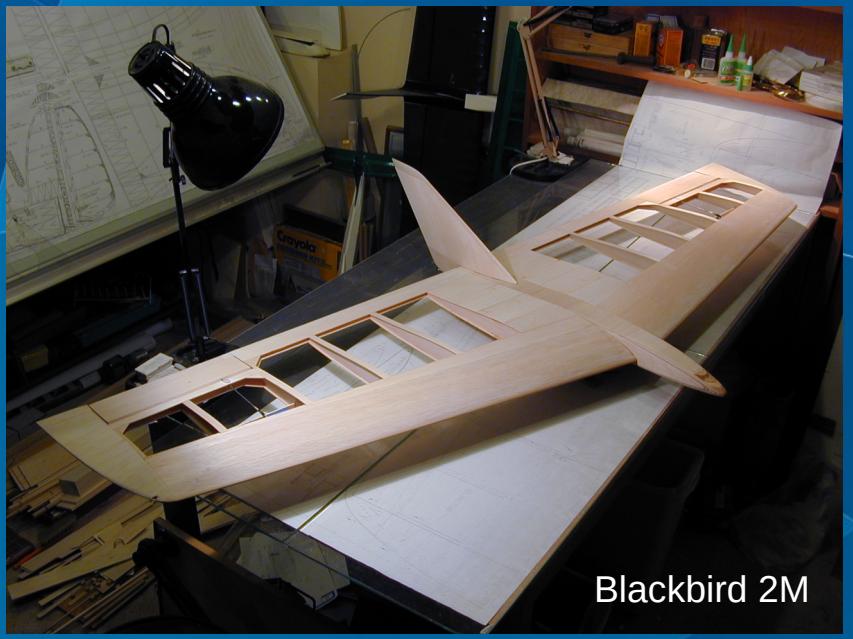

FAUVEL 14%
Basic shape
Cross-over point
Basic Shape
Camber line

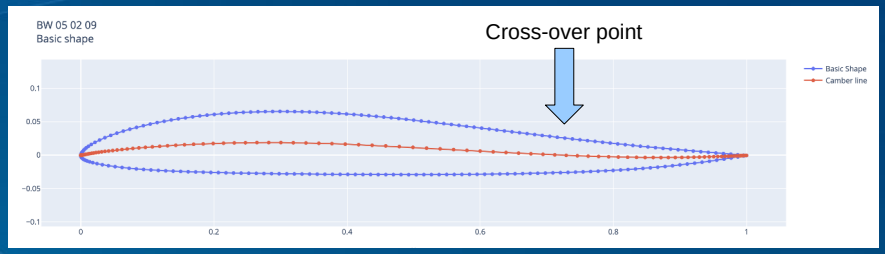

AV-32


R-2


CJ-3406
Cross-over point


CJ3209
Basic shape
Cross-over point
Basic Shape
Camber line


Blackbird 2M

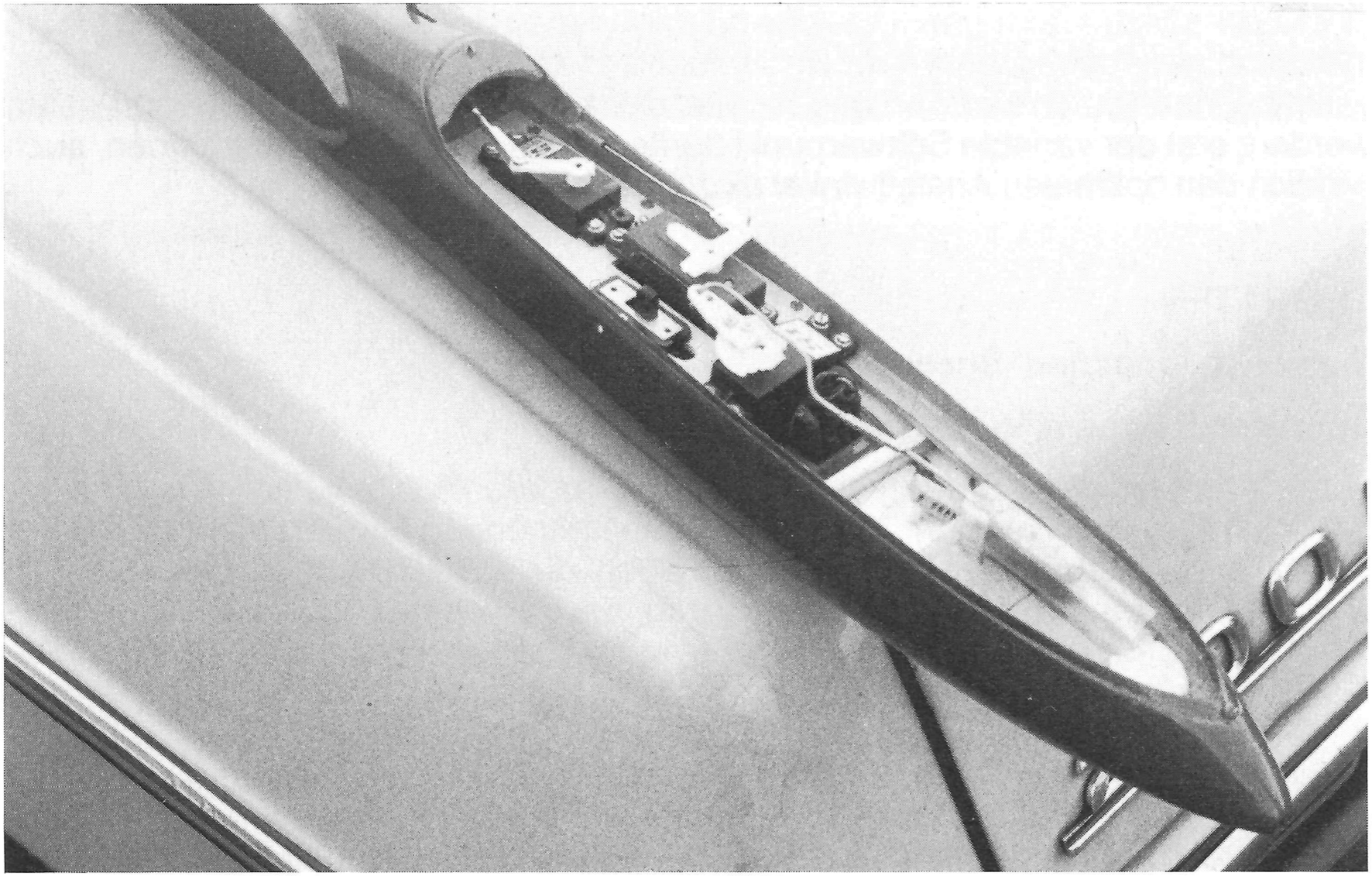

BW 05 02 09
Basic shape
Cross-over point
Basic Shape
Camber line



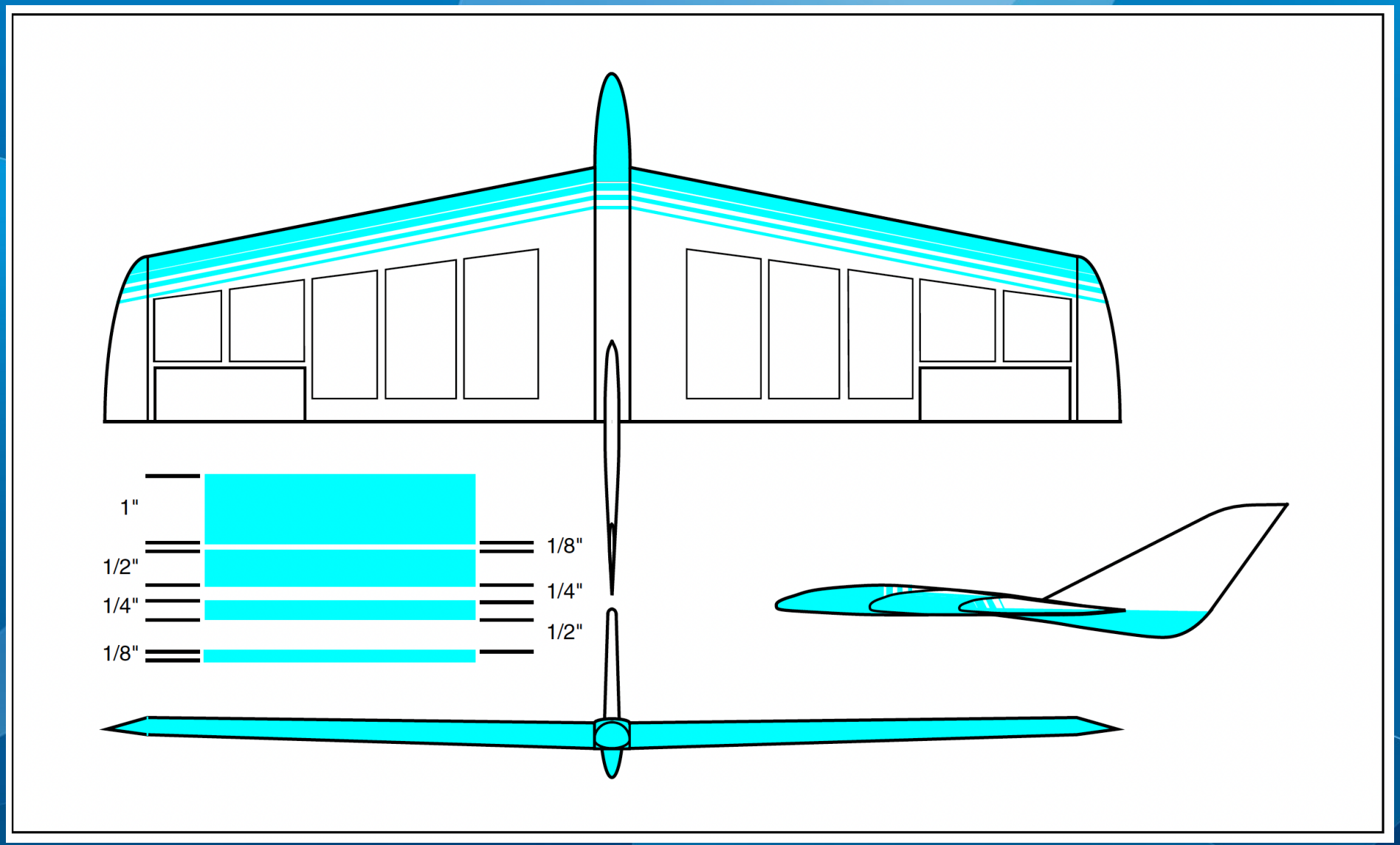
Blackbird XC
FAI max wing area = 2325 in^2, 16.15 ft^2
Weight = 8.5 lbs
Wing Loading = 8.4 oz/ft^2
BW 05 02 09

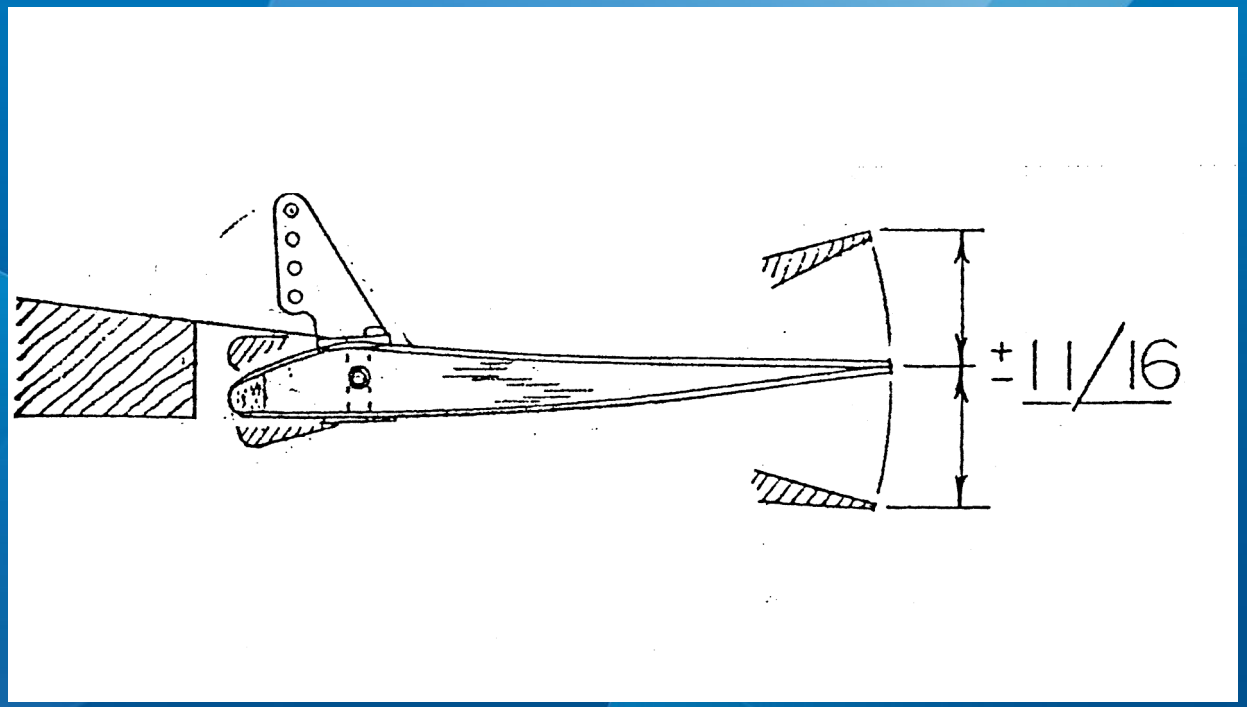


Jim Marske Pioneer III

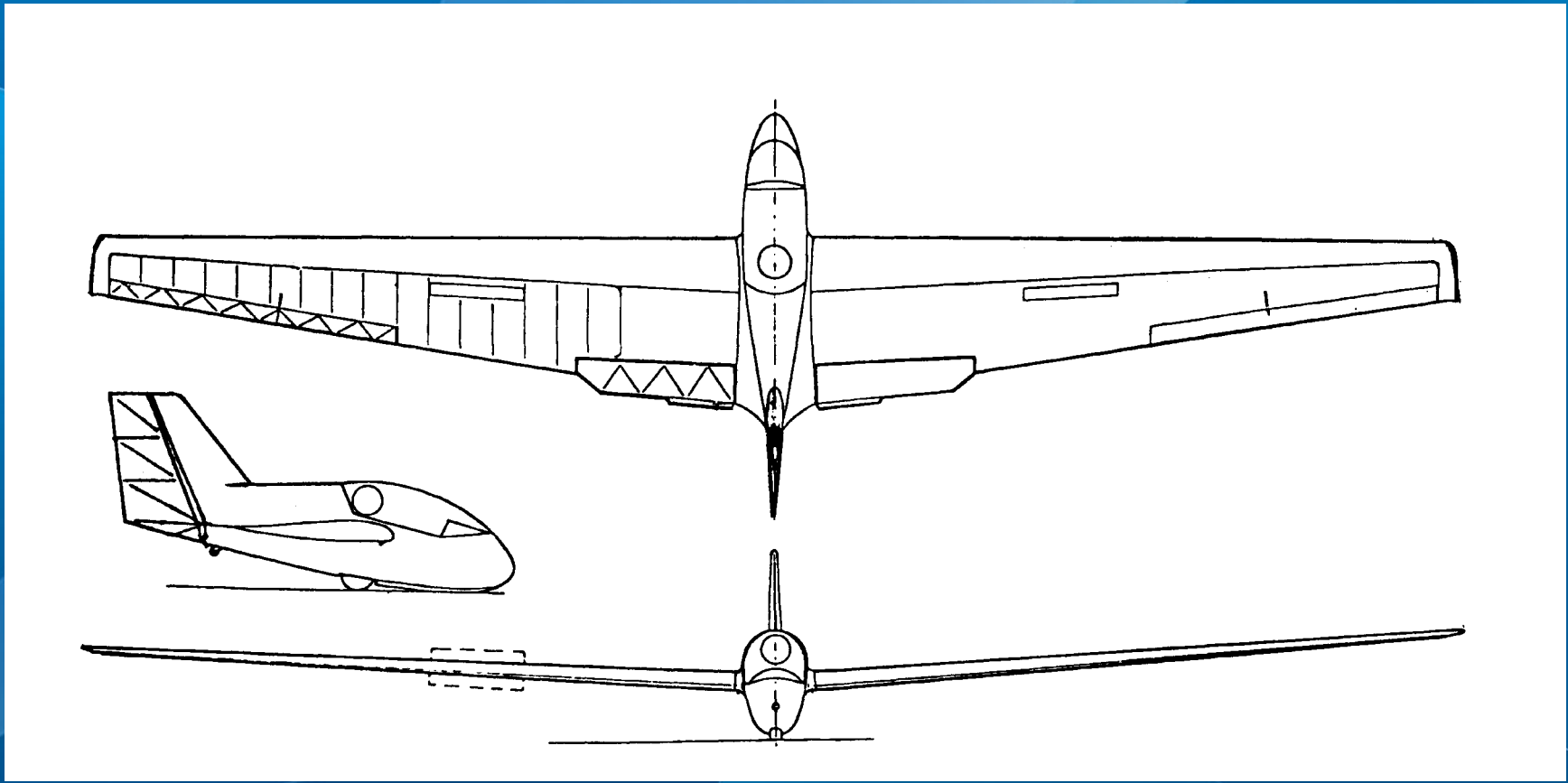




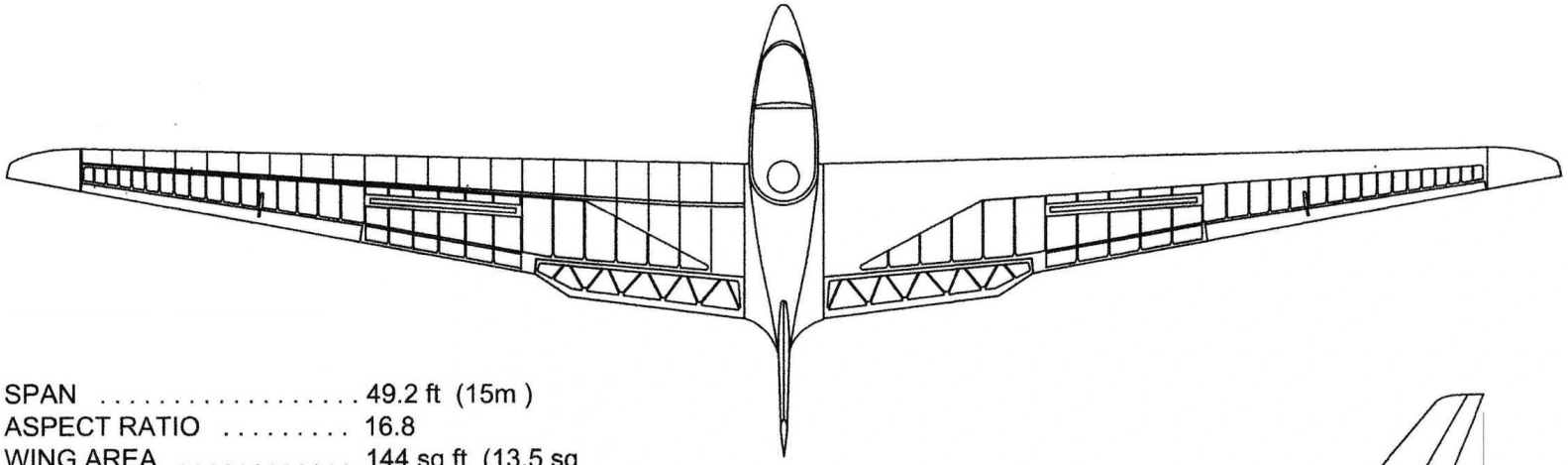

1"
1/2"
1/4"
1/8"
1/8"
1/4"
1/2"



Frise Aileron

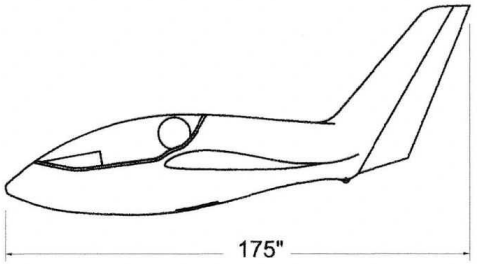


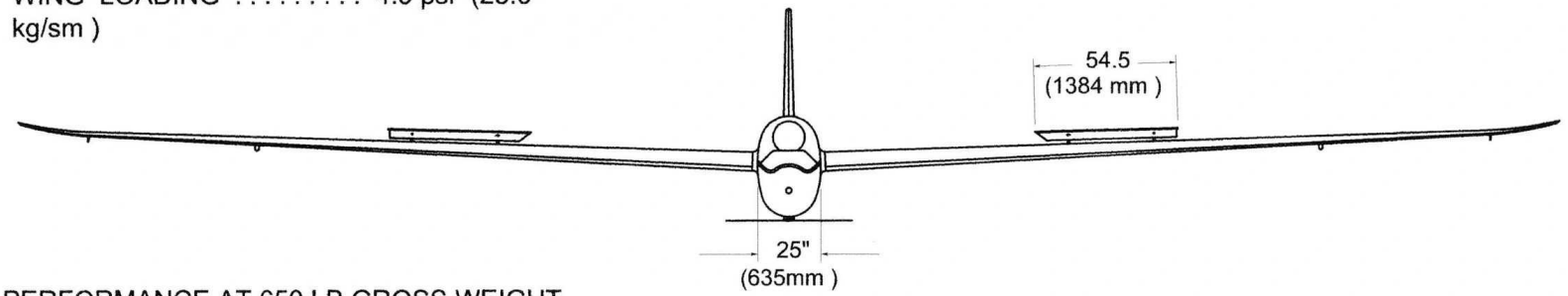
Jim Marske Pioneer II



SPAN . . . . . 49.2 ft (15m)
ASPECT RATIO 16.8
WING AREA . . . . . 144 sq ft (13.5 sq m)
1/4 CHORD SWEEP . . . . . -3.7 degrees
AIRFOIL M-35a
EMPTY WEIGHT . . . . . 445 lbs (202 kg)
PILOT AND EQUIP . . . . . 255 lbs (116 kg)
FLYING WEIGHT . . . . . 700 lbs (318 kg)
WING LOADING . . . . . 4.9 psf (23.6 kg/sm)

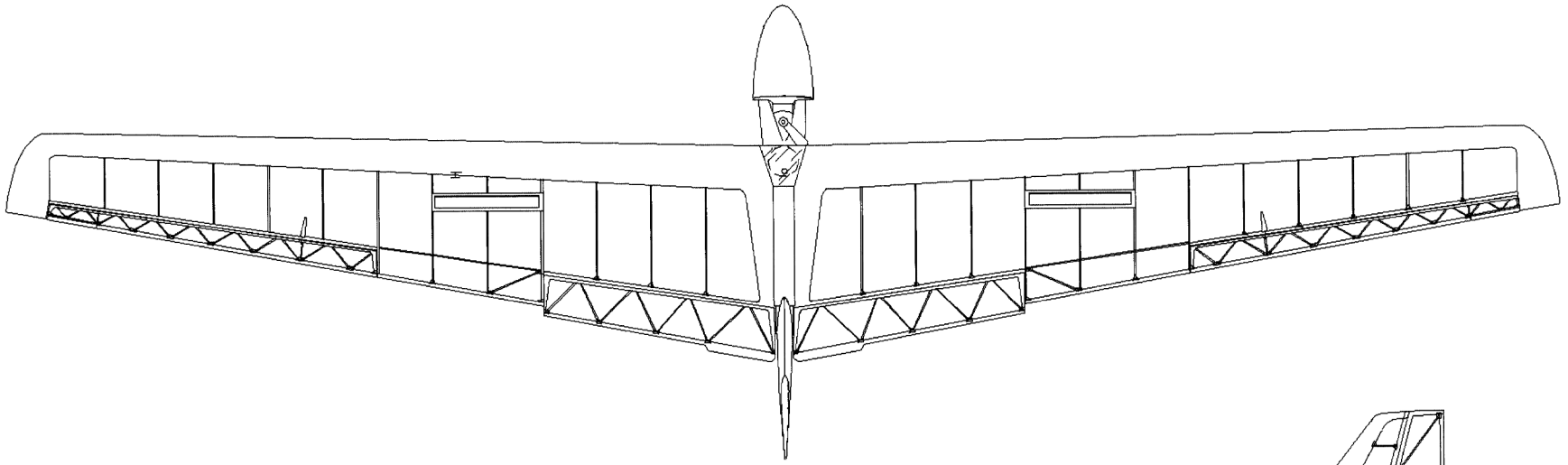




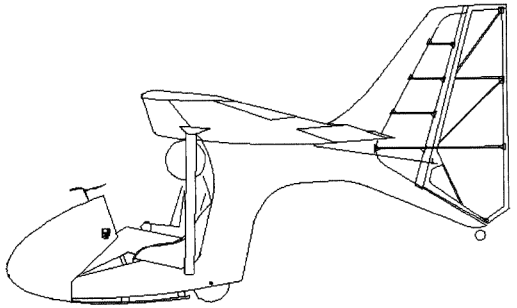


PERFORMANCE AT 650 LB GROSS WEIGHT
SINK RATE . . . . . 105 fpm @ 40 kt (75 kph)
GLIDE RATIO . . . 43 @ 55kt (102 kph)

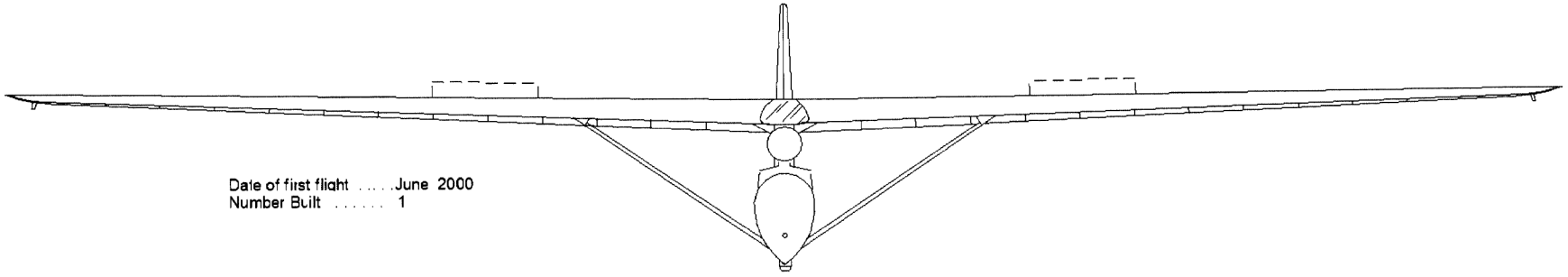
Jim Marske Pioneer III



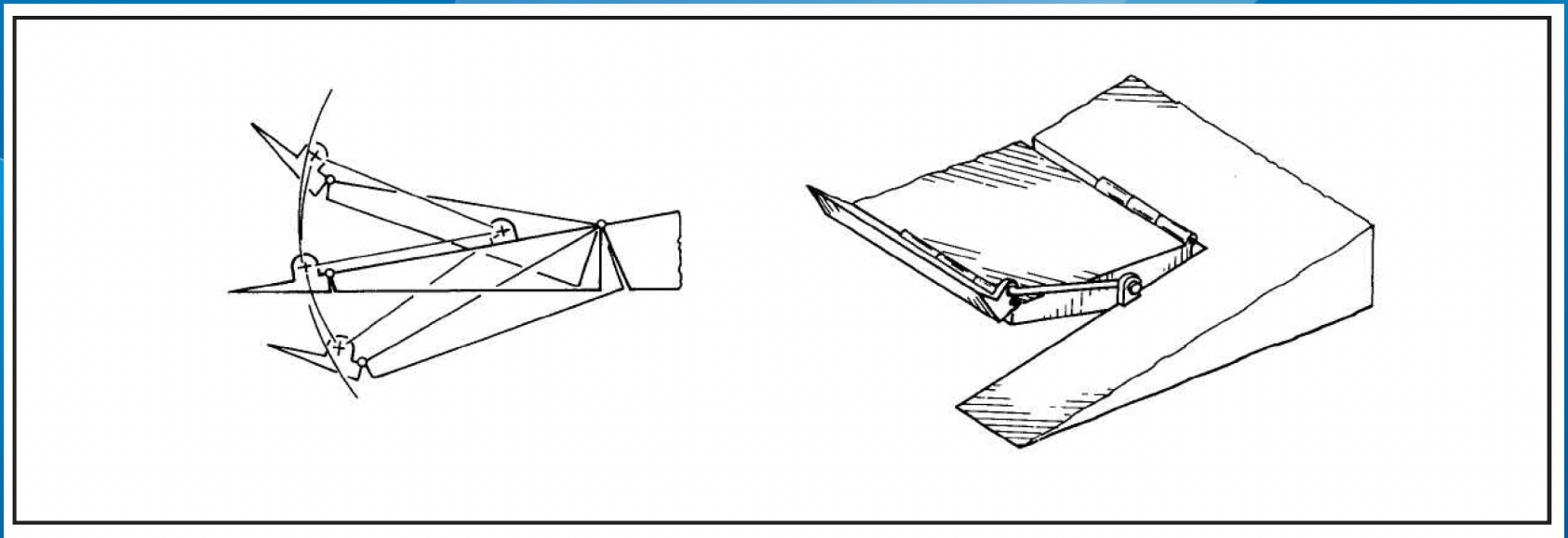
MARSKE MONARCH 'G'



	Glass	Carbon
SPAN	42.6 ft	
AREA	163 SQ ft	
ASPECT RATIO	11.1	
EMPTY WEIGHT	170 Lbs	140 Lbs
PILOT WEIGHT	110 to 220 Lbs	110 to 220 Lbs
FLYING WEIGHT	280 to 390 Lbs	250 to 360 Lbs
WING LOADING	1.7 to 2.4 psf	1.5 to 2.2 psf
GLIDE RATIO	20 @ 36 mph	20 @
MIN. SINK RATE	145 fpm @ 30 mph	fpm @



Date of first flight . . . . June 2000
Number Built 1



Kasper Tab



Bill & Bunny Kuhlman
With ¼ scale Pioneer IID

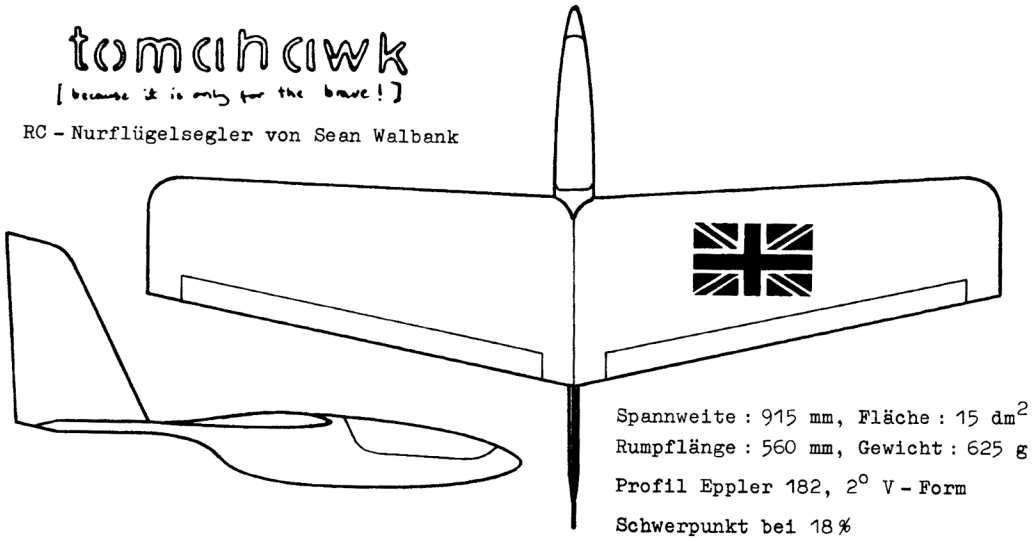
1988 National Mid-Columbia
RC Scale Soaring Fun Fly and
Soaring Social
(May 27 - 29 1988)
This model is currently owned by
Don Bailey of Seattle who has
recovered and painted it.



Jilles Smits 1/3 scale Pioneer III



The wings of Jilles Smits 1/3 scale Pioneer III



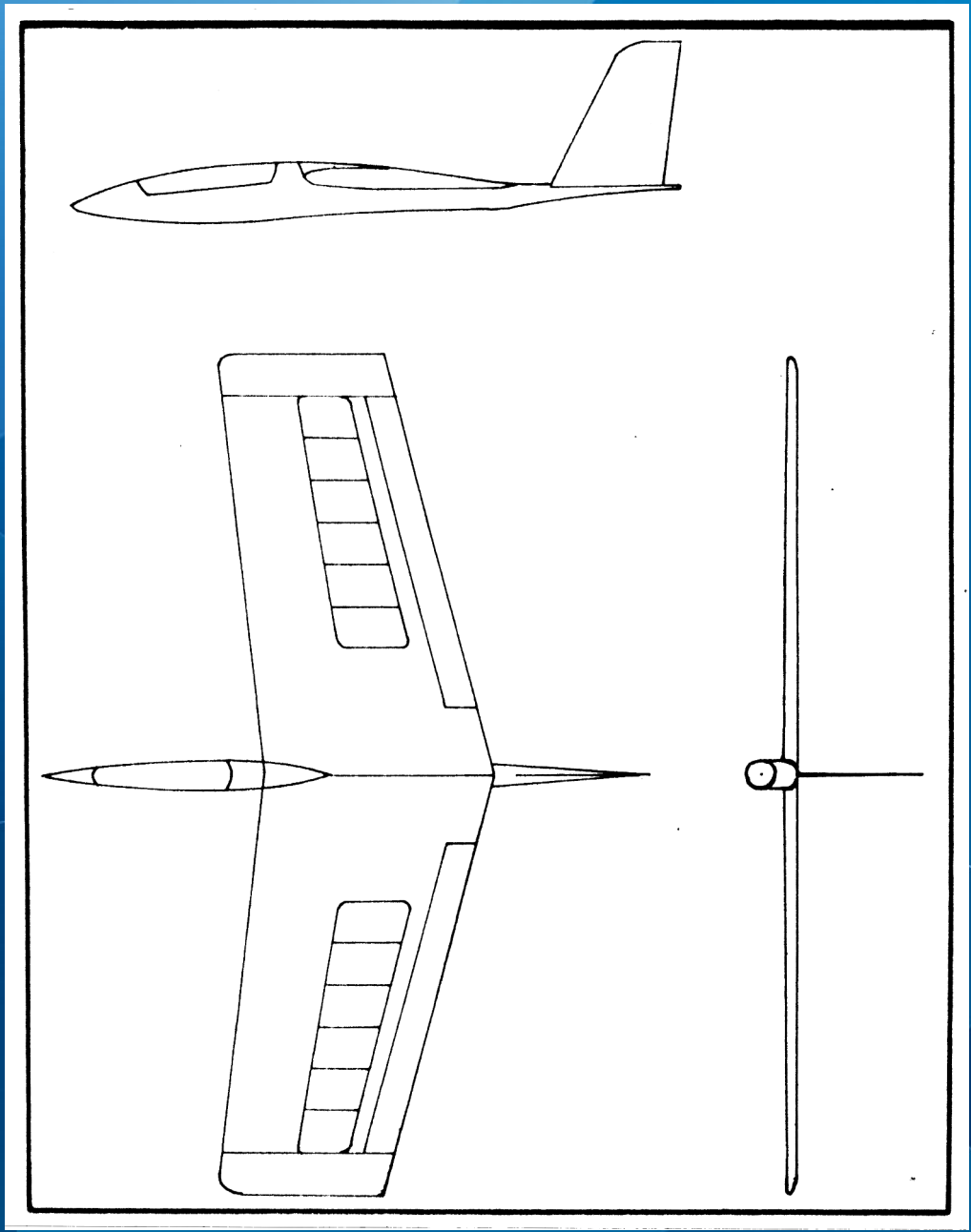


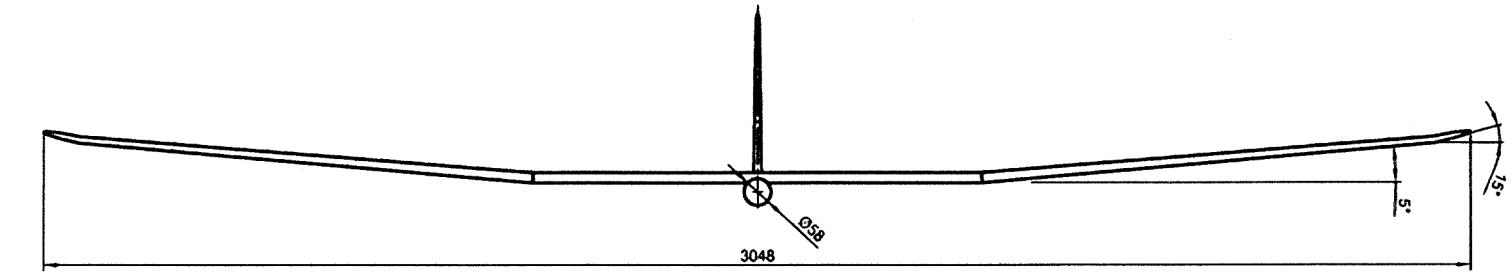
Sean Walbank Tomahawk

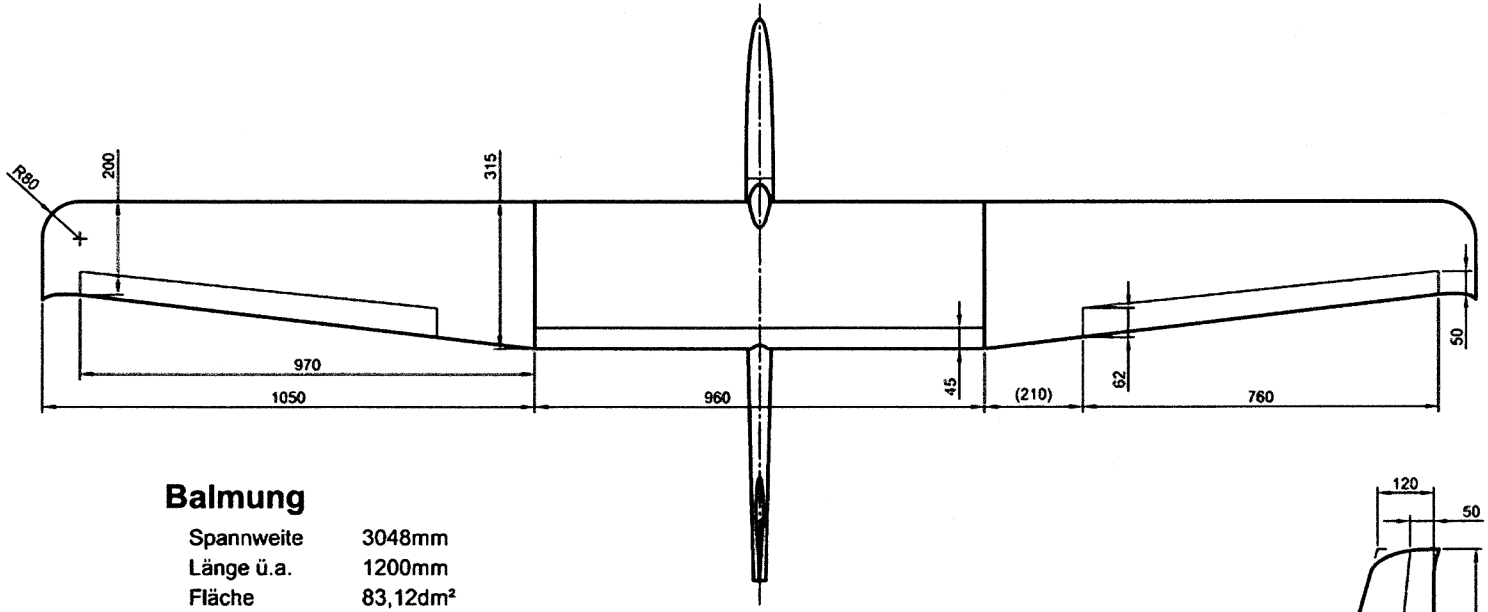
Because it is only for the brave!

Could be improved with separate elevator and aileron functions.

Mike Dawes' B-Cup

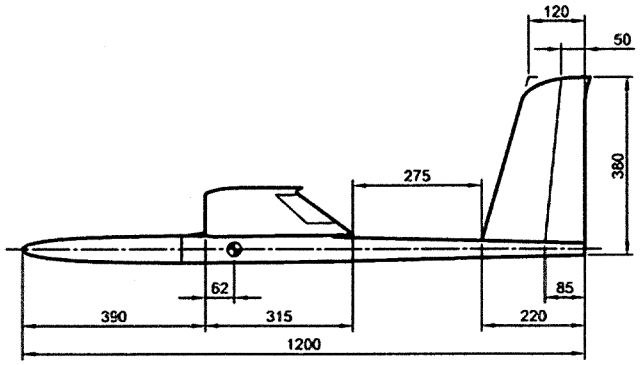


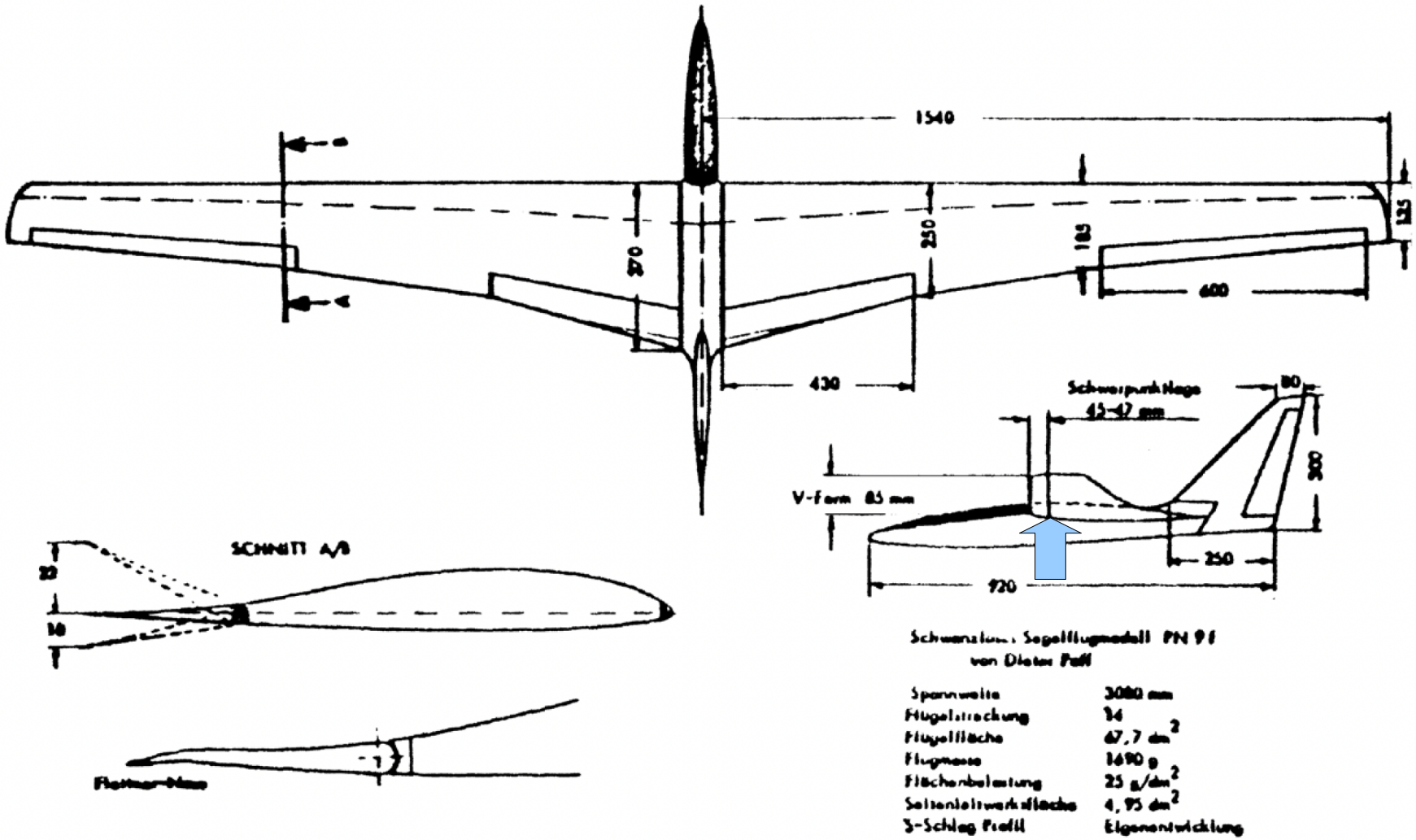




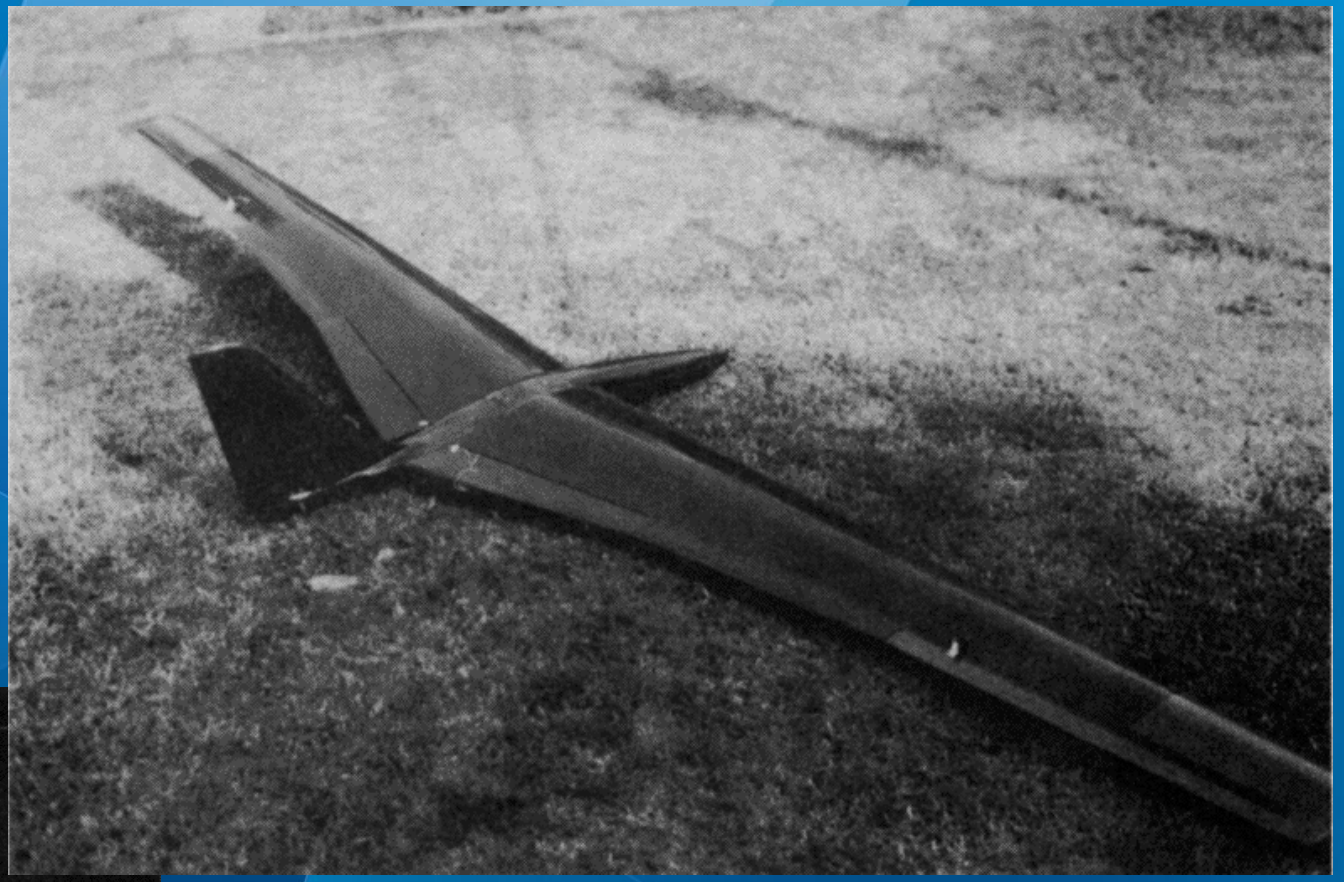
Balmung

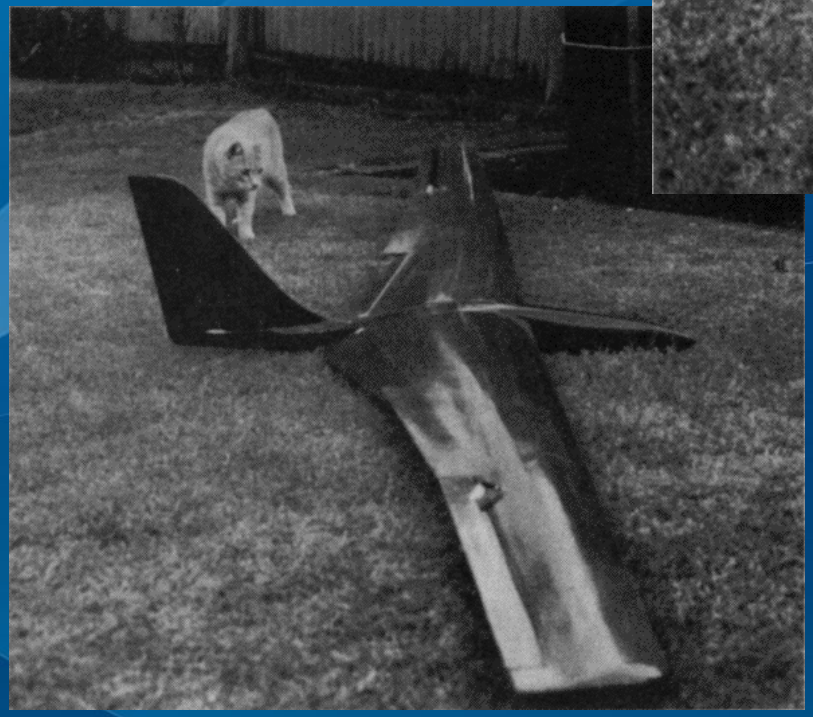
Spannweite	3048mm
Länge ü.a.	1200mm
Fläche	83,12dm²
Streckung	11,18
Profil Flügel	Curt Weller 1,7/7,0%
Fläche Slw.	5,89dm²
Profil Slw.	SD-8020
Fluggewicht	2200-2900
Flächenbel.	26,5-34,9g/dm²
Erbauer	Klaus Jakob, Mai 2005
Idee & Konzept	© Curt Weller 2005
Zeichnung	Hartmut Siegmann, 01.07.2006



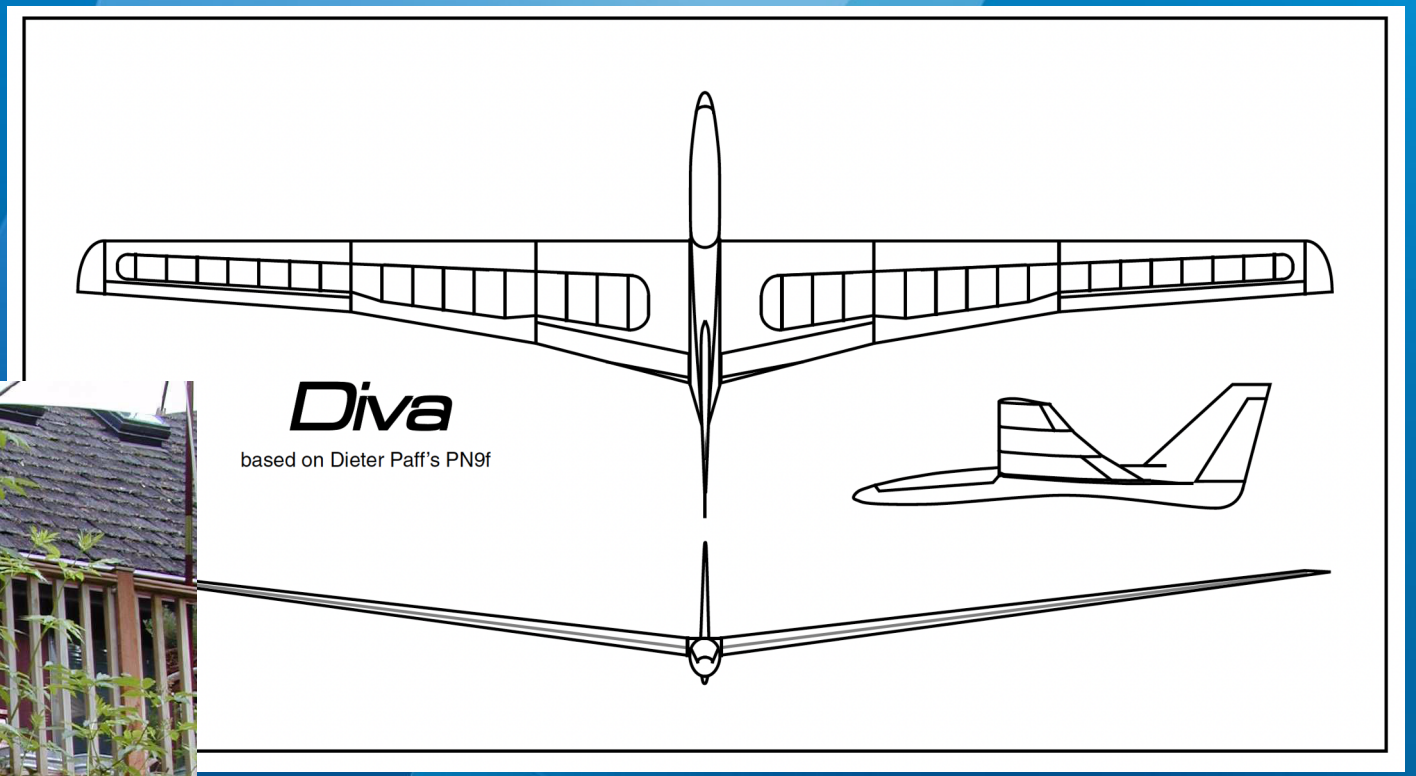


Dieter Paff's PN9f, reproduced from *The White Sheet*, Sean Walbank, editor.



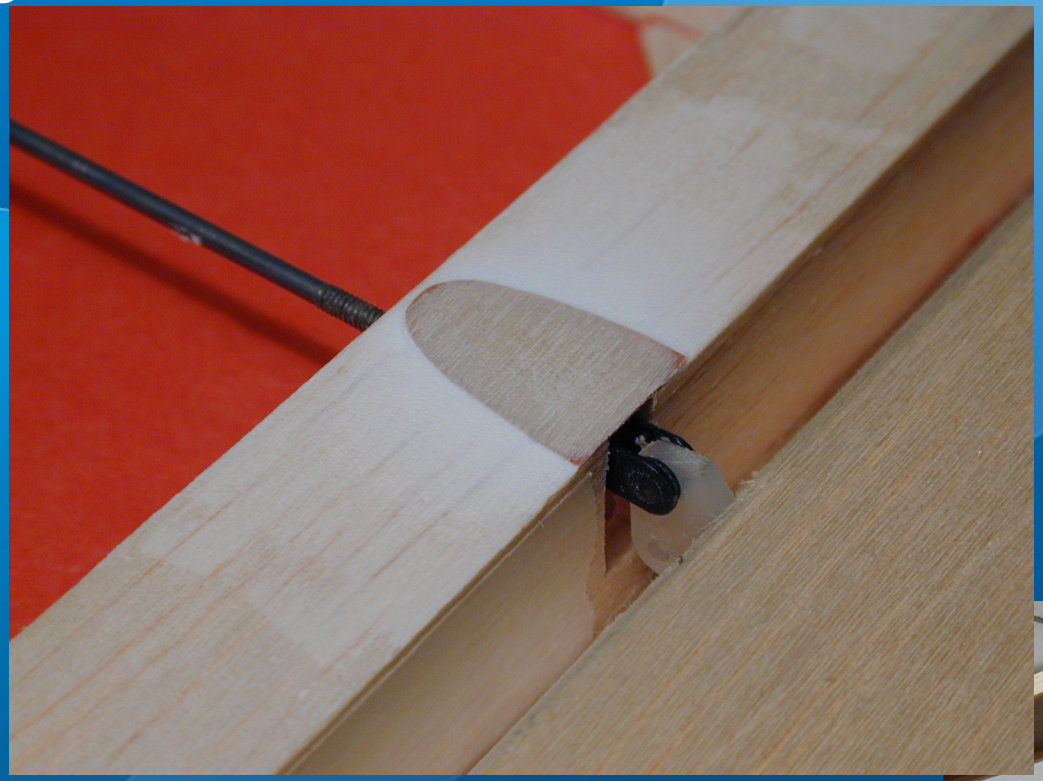


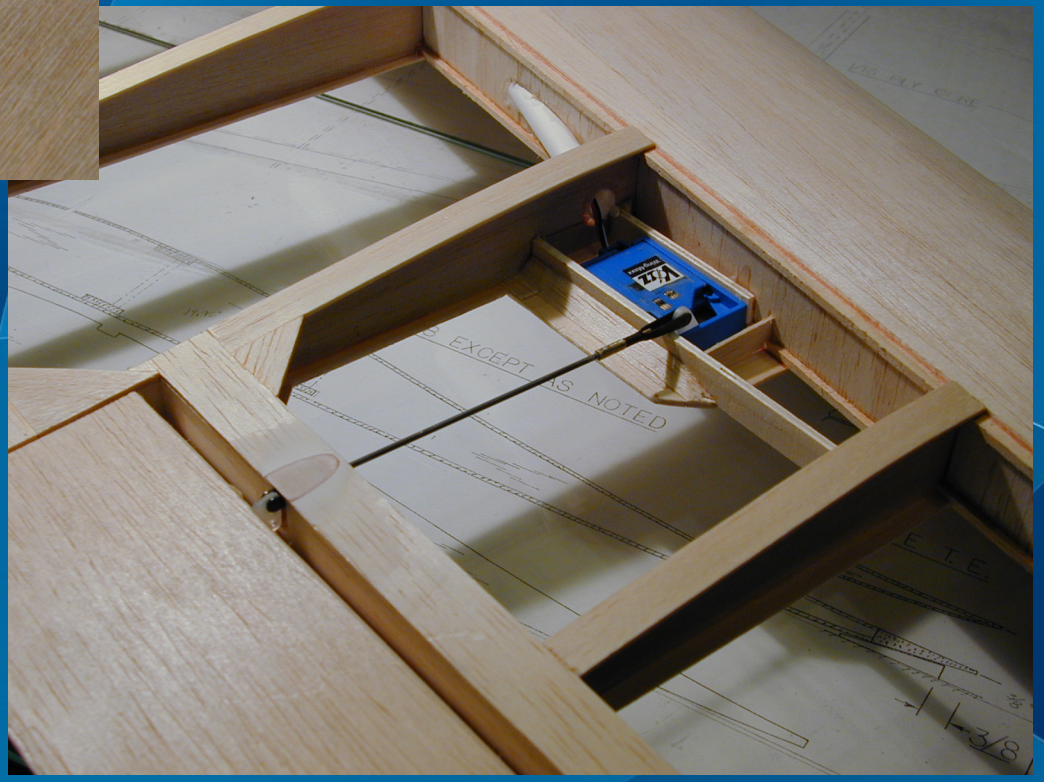
Martin Simons' PN9f

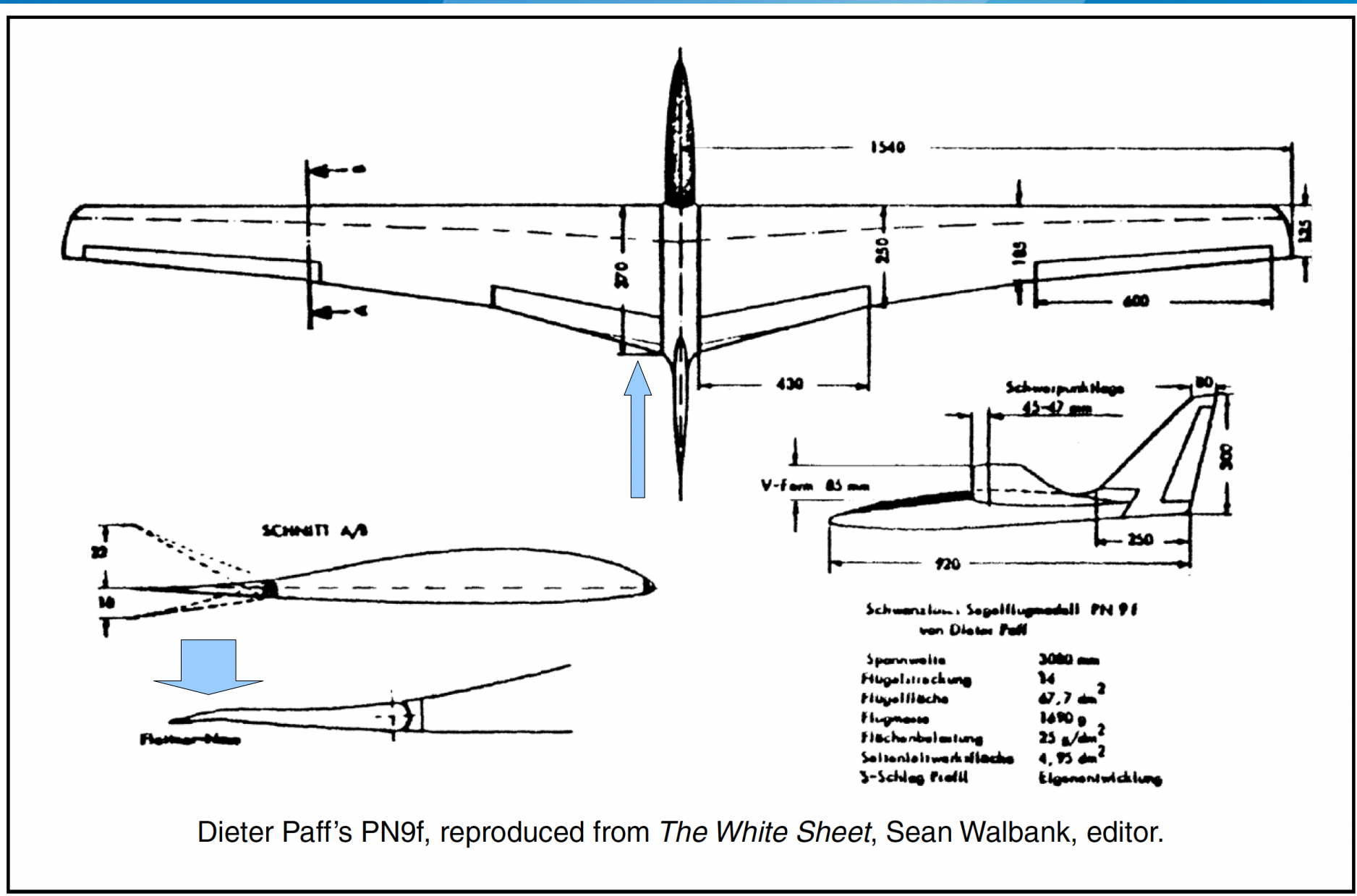




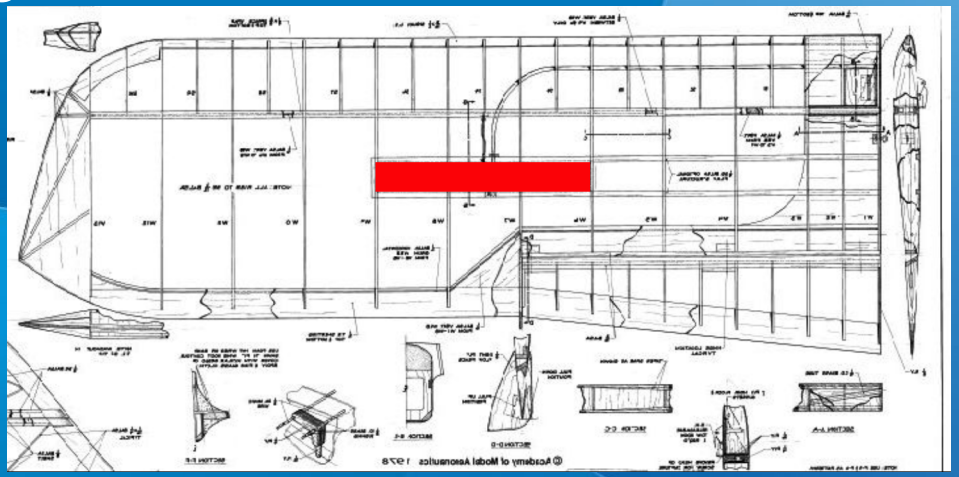
Bill Kuhlman / Alyssa Wulick Diva
(Based on Deiter Paff's PN9f)



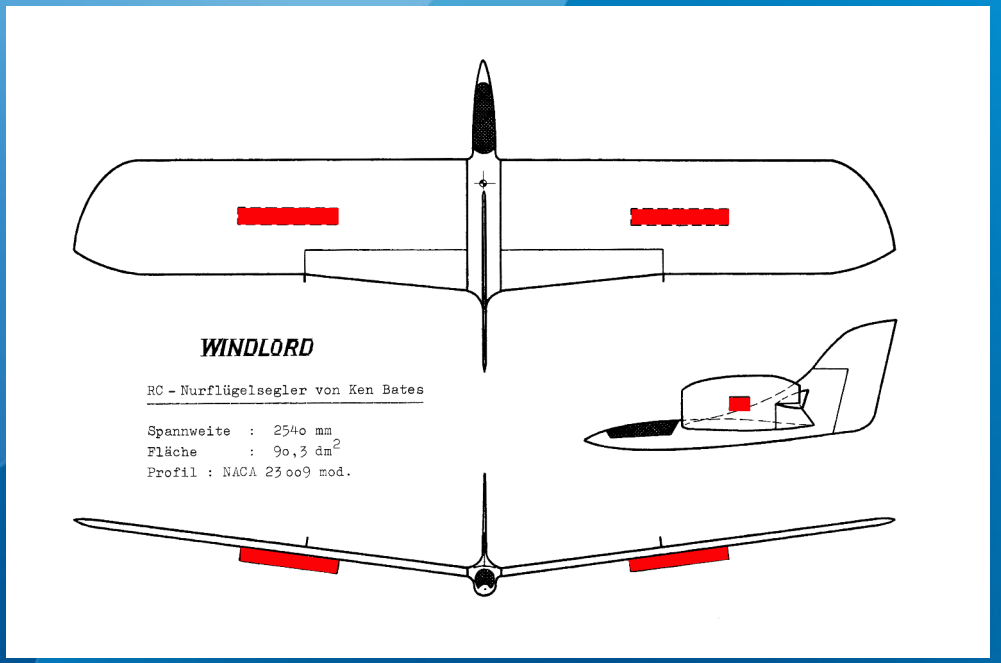

EXCEPT
AS NOTED
3/8

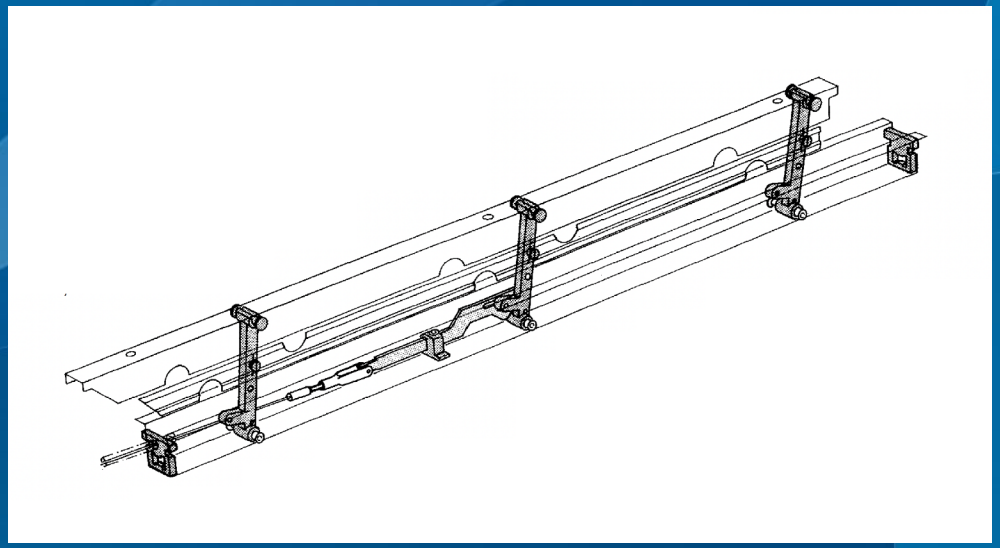


Dieter Paff's PN9f, reproduced from *The White Sheet*, Sean Walbank, editor.



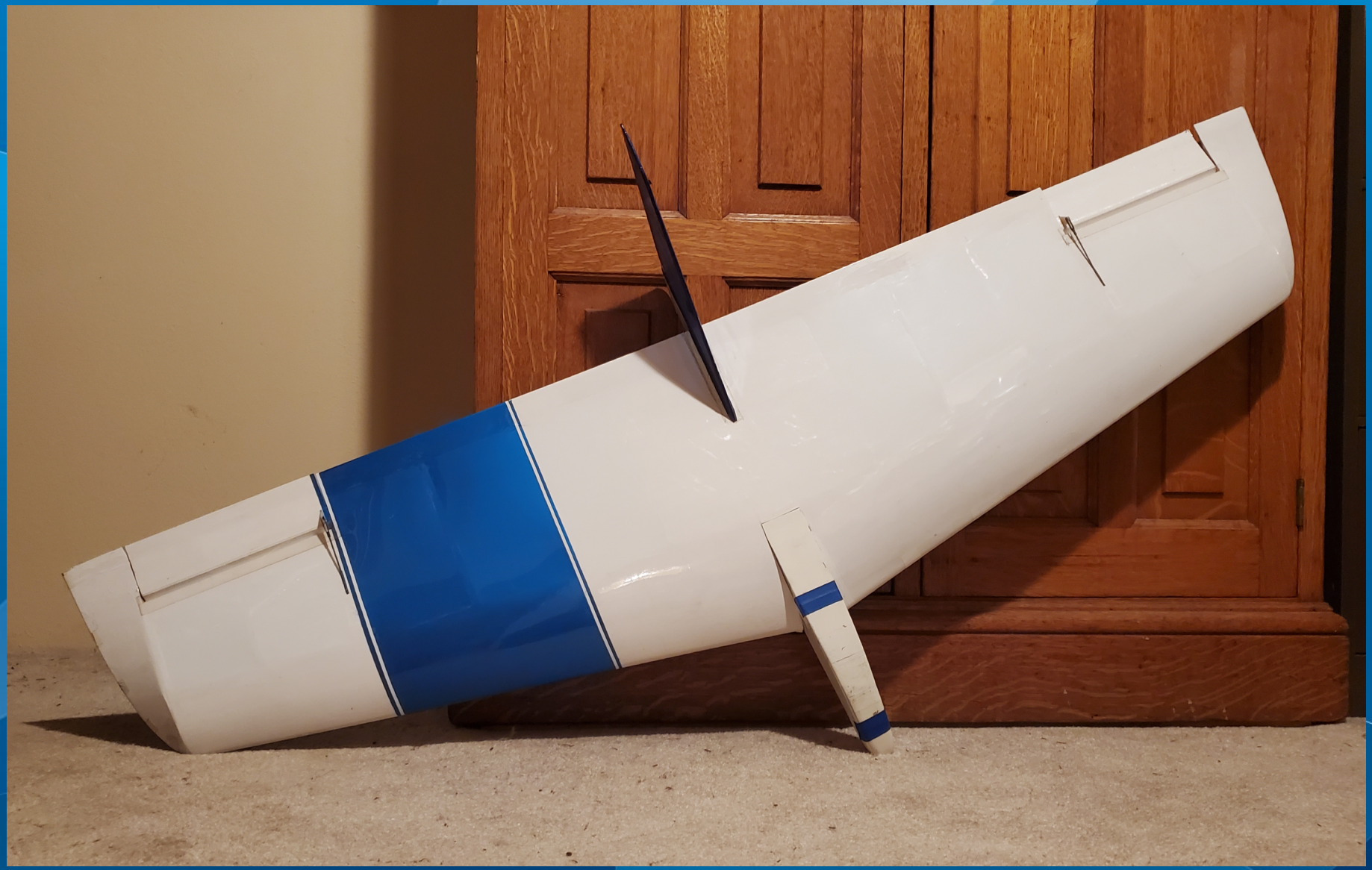
Ken Bates' Windlord



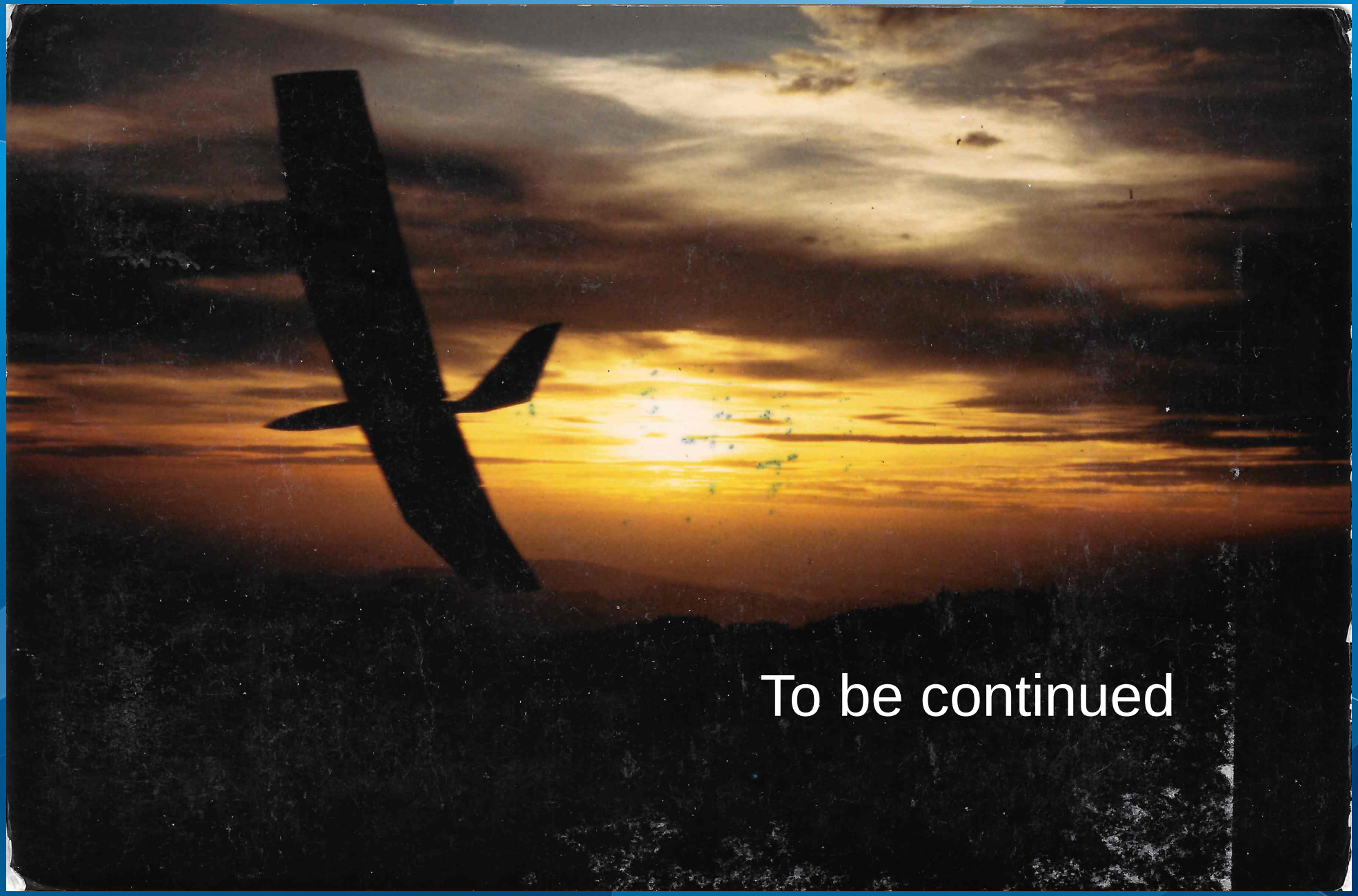


Multiplex Airbrake





Blackbird 1.5m RC-HLG


To be continued