Bubble Dancer RES 1:12 scale
Mark Drela  20 Feb 02

mass = 31 oz
m/A = 4.4 oz/ft^2  @ 31 oz
area = 1014 sq in
span = 117 in
A.R. = 13.5

CL = 1.1 max
= 0.8 min sink
= 0.6 max L/D
= 0.1 min
min sink = 0.80 ft/s @ 31 oz
0.96 ft/s @ 54 oz
max L/D = 23.0  @ 31 oz
26.0  @ 54 oz

m/A  = 4.4 oz/ft^2  @ 31 oz
= 7.7 oz/ft^2  @ 54 oz

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36" CF  boom
0.75" −> 0.42" ID
0.025" wall

3g caps
2g core
6g LE sheet
1g LE
2g TE
4g ribs
1g tip
1g glue
7g transp. Oracover
27g TOTAL tip panel

1g caps
10g core
2g wrap
14g LE sheet
2g LE
6g TE
13g ribs
1g sag strip
7g joiner box
2g glue
1g glass
13g transp. Oracover
82g TOTAL mid panel

4g caps
32g core
4g wrap
46g LE sheet
4g LE
14g TE
2g sag strip
18g spoiler
32g ribs
13g bolt beam
22g joiner boxes
2g gussets
5g glue
4g glass
24g transp. Oracover
271g TOTAL center panel

3g shell
9g hatch
15g hook beam
7g bulkheads
5g towhook
3g seams
8g glue
8g pushrods
36g boom
3g V-mount
15g TOTAL fuselage

53g shell
9g hatch
10g side beams
15g hook beam
7g bulkheads
5g towhook
3g seams
8g glue
8g pushrods
36g boom
3g V-mount
15g TOTAL fuselage

All−moving tail
100 sq in  9.8%
Vh = 0.40
−20 ... +12 deg
−6 deg mix−in
with full spoiler

73 sq in  7.2%
Vv = 0.025
+/-35 deg

Yaw inerta breakdown

---
tips 33%
mids 30%
center  6%
joiners  5%
fuse  1%
boom  5%
pushrods  1%
stab  7%
rudder  7%
radio  4%
TOTAL  100%

Inertias
---
Roll : 0.205 kg−m^2
Pitch: 0.076 kg−m^2
Yaw : 0.278 kg−m^2

Design (never−exceed) Loads
---
wing lift      150 lb @ 90 mph,  CL=1.0
root bend.mom.  2100 lb−in
root cap load  2800 lb
root cap area  0.030 in^2
cap stress     93 ksi
web stress     215 psi (shear)
root torsion   19 lb−in
root Dbox th.  0.094 in
wing Dbox shear 40 psi

Item weights
---
4x700mAh 90 g
1 HS81 17 g
2 JR341 36 g
Hitec 555 23 g
wiring  6 g
fuse   157 g
stab   21 g
rudd   17 g
rods   32 g
wing   489 g
TOTAL  888 g

31 oz

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1g LE
2g TE
4g ribs
1g tip
1g glue
7g transp. Oracover
27g TOTAL tip panel

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271g TOTAL center panel

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9g hatch
10g side beams
15g hook beam
7g bulkheads
5g towhook
3g seams
8g glue
8g pushrods
36g boom
3g V-mount
15g TOTAL fuselage

36" CF boom
0.75" −> 0.42" ID
0.025" wall

stab at 0 deg
to wing bottom

0.75" -> 0.42* ID
0.025" wall

Design (never-exceed) Loads
---
wing lift 150 lb @ 90 mph, CL=1.0
root bend.mom. 2100 lb-in
root cap load 2800 lb
root cap area 0.030 in^2
cap stress 93 ksi
web stress 215 psi (shear)
root torsion 19 lb-in
root Dbox th. 0.094 in
wing Dbox shear 40 psi