

Coho-95 Kite Plan (by Scott Bogue)

In the not too distant past, it was customary for the Fighter Kite Line Touch World Cup winner to post the plan of the kite (or one of them) used in the competition. I thought it might be good to revive this tradition, so here is the plan and some construction details on a kite that was really working well for me in the silky 8 mph or so winds we had on Thursday and Friday of the 2010 WSIKF week. In the description below, you will see I have shamelessly “borrowed” ideas from Johnny Hsiung, Ed Alden, Manny Alves, Steve Bateman, Chuck Lund, Bruce Lambert, and many others in designing and constructing this kite. But don’t blame any of them for all the flipping back and forth between inches and millimeters – that is my original contribution! The plan itself is on the final 3 pages of this file. You will need to print those pages out and then cut-and-paste them to get the full-size drawing.

As I recall, I drew the plan for this kite after eyeballing the dimensions off a Manny Alves kite that Johnny Hsiung was flying in one of our World Cup practice sessions at Santa Monica in July 2007. I shrank the dimensions down to about 95%, and built a prototype with a silver-colored Orcon that reminded me of salmon skin: hence the “Coho-95” name. The one I was flying at WSIKF is made of same Orcon, but with the silver side on the back. Johnny thought the black dots looked like the portholes on a flying saucer, and called it my “UFO” kite. (Now how does Johnny know what the portholes on a flying saucer look like???)



Following Ed Alden (whose chapter in “Fighters” book published by NFKA in 2000 was very influential on me), I think of North American fighter kite shapes in terms of ratios: width-to-length (A , the aspect ratio), how far up the spine does the line connecting the wingtips cross (T , the wingtip crossing point), and how far up the spine does the bow cross (B , the bow crossing point). The Coho-95 sail is reminiscent of Steve Bateman’s kites: the aspect ratio is relatively high (it’s 21% wider than it is tall), and the wingtips are well above the midpoint of the spine (57% of the way towards the nose). In contrast, most kites I build and like to fly have lower aspect ratios (12% to 15% wider than tall) and lower wingtips (crossing the nose 47% to 50% of the way towards the nose), a bit more like a traditional Indian fighter shape. The kite on the left in the photo below, for example, is 15% wider than tall and has wingtips right at the midpoint of the spine.



There are two other details about the shape to mention. The first is that the straight part of the leading edge (at the nose) does NOT project directly to the wingtips. Instead, it projects to a point about 1/2" below the wingtips, which has the effect of increasing the amount of sail on the leading edge that is secured to the bow and making the nose smaller and sharper. The second detail is that the trailing edge is gently curved, bending in about 1/4" from what it would be if straight.

On the template, there is a 1/4" margin drawn in at the nose. I apply double-stick scotch tape to this margin and fold it over onto the nose to make this part of the leading edge more durable (and a bit stiffer). To reinforce the nose only with tape, I would have to cut the 1/4" margin off before using the template.

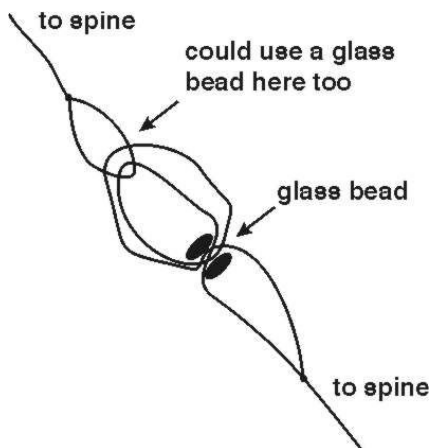


There is also a margin (about 6 mm wide) on the part of the leading edge that attaches to the bow. I use contact cement up here (on the bow and the back of the sail). During construction,

after first sticking the bow down onto the sail, I trim the margin to about 3 or 4 mm (for an 0.06” diameter CF bow). That amount is enough for the sail to *just* wrap around the bow with no excess, giving a clean look to this part of the kite. I have always admired this detail on Chuck Lund’s kites – I presume he does something similar.

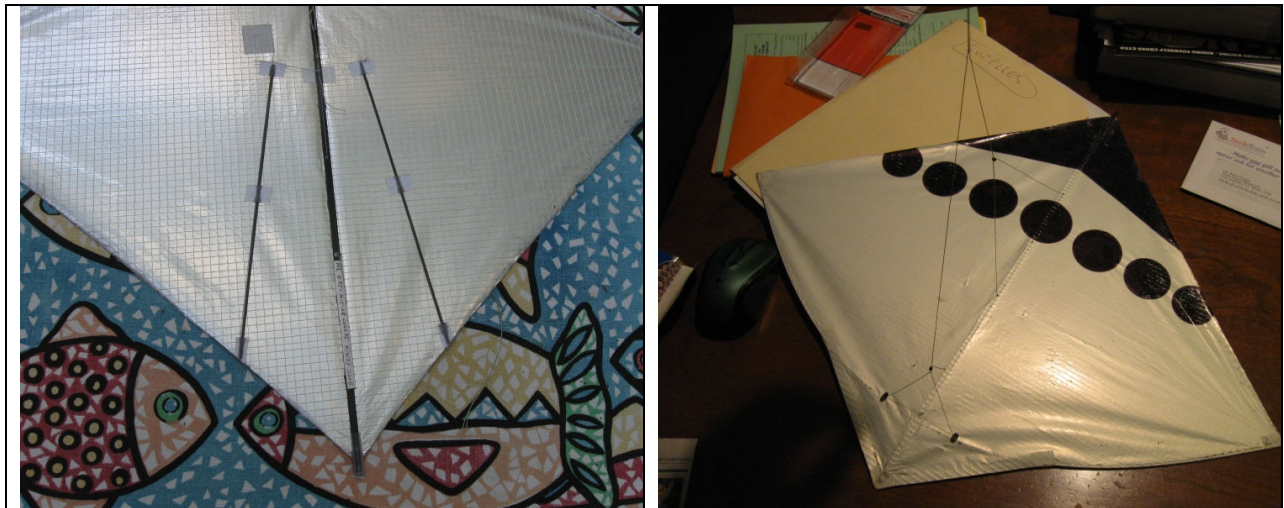


For the spine, I used a piece of rectangular carbon fiber flat stock (0.04” x 0.166”, or about 1 mm x 4 mm). I remember Steve Bateman first showing me kites with spines made of this stuff at a fighter kite gathering in Tucson back in 2004. I like to put a *little bit* of permanent bend into the spine, and so use a technique devised by Bruce Lambert. The idea is to split the CF flat stock (as if it were a piece of bamboo!), apply superglue in the split, and then clamp the piece onto a curved form until the glue sets. (To see how it works, check out Bruce’s YouTube video at <http://www.youtube.com/watch?v=kOIOFoBrWzA>). Most superglues do not stick well to CF. One that does is Pacer “Flex-Zap II”. I recently tried Gorilla Super Glue (“Impact Tough Formula”) and it also seems to be okay (and easier to find than Flex-Zap II.) I also use a tensioner line to add a bit more bend to the spine. I love Manny Alves’ ingenious double-pulley system (with 1 or 2 small glass beads) to adjust the tension, which requires much less force when the spine already has the first bit of bend laminated into it.

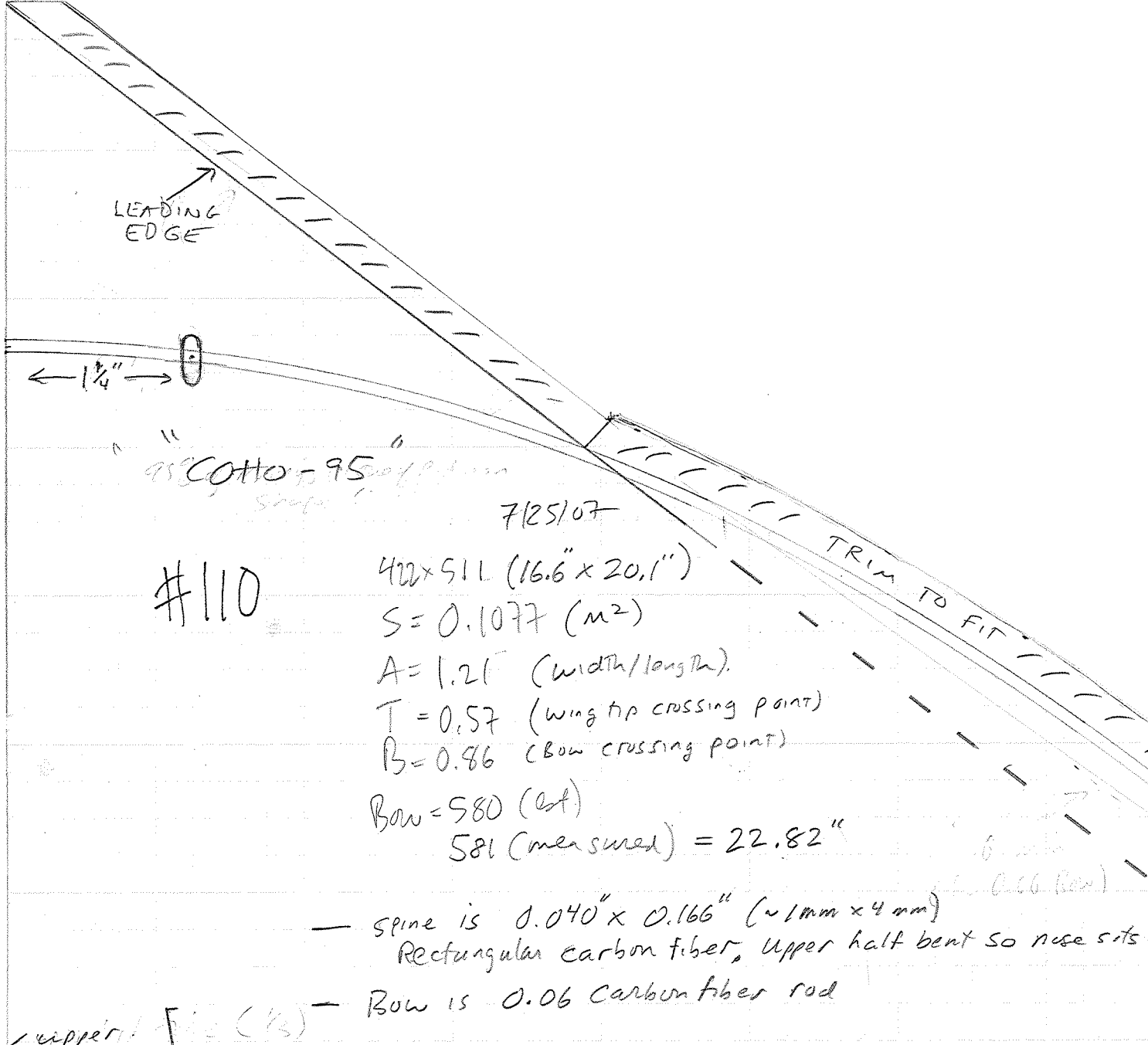


The stays on this kite were hasty improvisation I did on the beach with Johnny when I first tried this kite. I had originally built it with 4 shorter stays but did not like the way it flew. Johnny spotted two longer pieces split from very thin flat stock CF in my kite box and suggested I tape those on instead. They are about 0.02" x 0.055", roughly the same weight as 0.04" CF rod, but more like 0.03" rod (which I usually use for stays) in terms of stiffness. They are also longer than the stays I usually put on kites. Perhaps these weird, oversized stays are part of the reason this kite flies so well?

The kite is rigged with a 4-point bridle, with attachment points 1/3 and 2/3 of the way towards the tail from the bow crossing point. As you can see in the photo, I have tiny glass beads at the yoke attachment (making it easy to microadjust) and where the lower bridle legs link to the top leg (so that the connection point can slip). The lengths of the bridle legs are set so that they come just short of the corners of the kite. Ala Steve Bateman, I drill small (0.029") holes in the CF spine to attach the bridle and tensioner lines. The kite with rigging weighs 0.32 oz (9.2 g).



I have flown this kite quite a lot, and it shows. The wrinkles and patches you can see in the photos were not there when it was new. Not visible in the pics is what is happening on the trailing edge – the reinforcing fiber grid (or “scrim”) has delaminated from the film, and several good size chunks of the film have shattered off. I (and many others) have noticed these kites often fly better after they have been “broken in” a bit. Perhaps this softening of the trailing edge is part of that process?



LEADING
EDGE

← 1 1/4" →

"
95 COTHO - 95
Slope"

7(25)07

#110

402x511 (16.6" x 20.1")

S = 0.1077 (m²)

A = 1.21 (width/length)

T = 0.57 (wing tip crossing point)

B = 0.86 (Bow crossing point)

Bow = 580 (est)

581 (measured) = 22.82"

TRIM TO FIT

— spine is 0.040" x 0.166" (~1mm x 4mm)
Rectangular carbon fiber, upper half bent so nose sits

— Bow is 0.06 carbon fiber rod

← upper
bridle
(1/3)

← spine bend
ends here
(1/2)

← Lower end
of tensioner
(1/2 way
between bridle
attachment

(1/2 way between
bridle attachment
Mark)

Rectangular carbon fiber, upper half

Row is 0.06 Carbon fiber rod

← upper

bridle
(1/3)

← spine bend
ends here
(1/2)

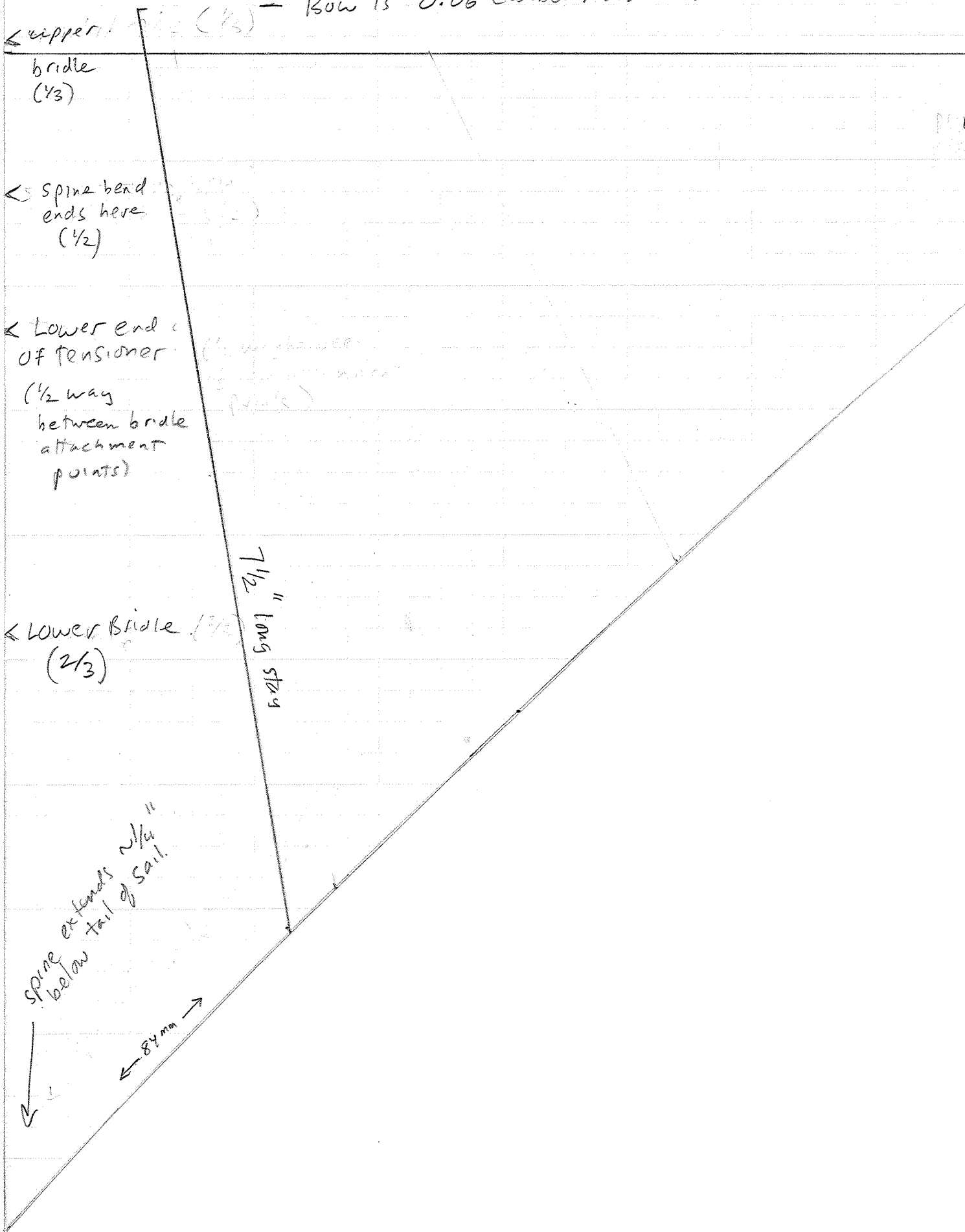
← Lower end
of tensioner
(1/2 way
between bridle
attachment
points)

← Lower Bridle (1/3)
(2/3)

7 1/2" long stay

spine extends 2 1/4" below tail of sail.

84 mm →



7/25/07

2x511 (16.6" x 20.1")

= 0.1077 (m²)

= 1.21 (width/length)

= 0.57 (wing tip crossing point)

= 0.86 (bow crossing point)

w = 580 (est)

581 (measured) = 22.82"

is 0.040" x 0.166" (~1mm x 4mm)

Rectangular carbon fiber, upper half bent so nose sits up ~1/2"

w is 0.06 carbon fiber rod

TRIM TO FIT

0.166 (bow)

Leading edge projects to here

