

AEROSPACE COMPOSITES'
UNIDIRECTIONAL FIBERGLASS CLOTH
and
GEARS FOR JR'S MICRO SERVO

Swept wings require both resistance to bending along the span, and torsional rigidity. Without resorting to a balsa skin, the first requirement has been an elusive goal for us. During construction of Penumbra.4, however, we had the opportunity to work with a new and unique type of unidirectional fiberglass cloth, and it now appears our elusive goal has been attained.

Unidirectional cloth usually consists of two sets of fibers. The first set, about 90% of the total, runs the length of the fabric; the second set is woven at 90 degrees to the main fibers and serves to hold the material together. These unidirectional fabrics are usually woven from threads, each consisting of many individual glass fibers. The lightest unidirectional cloth we were able to find was 6oz./yd.² - too heavy for our application.

Enter a 4 oz./yd.² unidirectional S-glass fabric from Aerospace Composites and George Sparr. This fabric is beautiful! Rather than "ropes" of glass fiber, this Aerospace Composites cloth consists of ribbons of glass fibers. Each of these ribbons is about 3/32" wide and is the thickness of a single glass fiber. Spacing between the ribbons is about 1/32", held in place by very fine fibers of seemingly continuous length. These lightweight fibers, which may be of polyester, appear to have been sprayed on in a random way. There is no determinable pattern, but the coverage is very even and their strength is rather remarkable.

In our experience, all cutting was easily accomplished with ordinary plastic handled stainless steel scissors. Our application required cutting curves, so a cardstock template was made. No problems were experienced, regardless of cutting direction. Some minor curling was noticed, but this disappeared completely once we started applying epoxy. The epoxy, although on the

thick side, flowed through the fabric quite easily. We used flexible plastic squeegees to spread it evenly. Those lightweight random fibers stayed in place throughout all of our scrapings, but we made sure we always moved the squeegees and blade with the grain so as not to apply too much stress to them.

Our layup consisted of two light coats of vinyl paint applied directly to the mylar, a layer of 3 oz./yd.² bidirectional cloth oriented on the bias (45 degrees), then the Aerospace Composites unidirectional cloth. This was then vacuum bagged to a pink foam core.

The overall result is fantastic! The 3 oz./yd.² bidirectional cloth provides an excellent exterior surface, particularly with the vinyl paint exposed, and imparts a large amount of torsional strength to the wing. The spanwise strength provided by the 4 oz./yd.² unidirectional cloth is far greater than what was achieved with the two and three layers of 3 oz./yd.² bidirectional cloth we previously used. Total weight remains the same. With an integral carbon fiber reinforced spar system, this wing is incredibly rigid.

The 4 oz./yd.² unidirectional S-glass comes in a width of 30 cm (just under 12"). It is available only from Aerospace Composites. Please mention RCSD and "On The 'Wing..." when ordering. Thanks!

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Our nine JR micro servos are now humming along happily following the arrival of a dozen output shafts. The output shaft of the 305 became the weak link when JR incorporated metal gears in the train some years ago. Spending several dollars for the whole gear set is no longer necessary as you can now obtain the output shafts alone for under a dollar each! The JR 305 micro servo is a gem and needn't lie idle for lack of this critical part. Ask for Part #JRA65305E.