the wings on before any fuselage covering can begin.

Fabricate all the small components for the lift and 'I' struts, and bolt the top wing to the cabanes, final drilling the two holes at the cabane bushing attach after cross-measuring from the wing tips to the center of the fin post. The lower wings can now be bolted in place, and the dihedral set by propping up the wing tips. Rig the wings with no washout initially. With the lift strut components in place, drill thru the extruded lift struts, and into the fitting centers. Be careful here, measure twice, drill once. Install the I strut top and bottom tubes, and components, then cut and tack weld in place the 3/4" and ½" tubes to flush out the 'I' struts. Finish weld as much of the struts as possible before removing from the wings, to keep distortion to a minimum- Caution- do not get the aluminum wing structure hot from the torch!!

The wing tips are best bent up with a plywood bending mandrel. Align the wing tip trailing edge with the aileron in neutral position. Bolt in place, and rivet gussets to structure. Surgical, or masking tape can be used, in sections, to cover and blend, to rivet and gussett protrusions that would show through the finish fabric. The aileron throws will give you a minimum of 20 degrees up travel, and 15 degrees down. As well- the elevator is 30 degrees up, 25 degrees down, and the rudder is 35 degrees each side.

Chapter 7- Covering and painting

This chapter will 'cover' the methods used by Hart Aero in our prototypes, as well as the restoration business. I have tried several systems , even the latex system, and I keep coming back to the old standby- Nitrate and Butyrate Dopes, over Dacron. A Dacron/Dope fabric job will last for years, almost indefinately, indoors, and a reasonable Gloss can be achieved with out tons of wet sanding, which can get hazardous to the fabric job in the hands of someone who might not know how to sand fabric.

On the Ultralights we use 1.7oz. Uncertified Dacron, heat shrinkable. I use large headed pop rivets to attach the fabric to the ribs, and a lightweight 2" wide pinked- edge surface tape over the ribs, and at seams. The fuselage belly is covered first, glued around the lower longerons, then lightly shrunk. Then the sides are glued on. The left side top glues around the top headrest stringer, the right one overlaps that joint by 3/4" The glue used is Stits Poly-Tak, or the Randolph Rand-O-Bond adhesive. The sides are then shrunk- the overlap on the lower longerons is also 3/4" minimum. All horizontal taping is then applied with Nitrate Dope, thinned with Universal thinner 40%. This dope is sprayed on with a Wagner Powermatic sprayer. Taping is from back to front, and I use 1" wide tapes at the small stringers. The Vertical tapes around the headrest, and at the firewall, overlap the Horizontal tapes. The whole fabric surface is then sprayed with 2 coats of Nitrate dope. Make sure it is not a humid day, the Nitrate blushes easily, and Blushing of Nitrate reduces adhesion.

Using Scotch-Brite pads, scuff the dry surfaces, to remove any fuzzies and imperfections. Now is the time for the Silver- Pigmented Butyrate dope. This is the build up dope, that also prevents Ultraviolet degradation of the fabric. I usually apply 4 coats of Butyrate to a fabric, lightly wet sanding inbetween coats with 320 grit paper. The Butyrate dope is applied with a regular siphon type spray gun, with 45 psi pressure from the compresser.

The finish colors in dope are thinned as follows: 25% color, 25% Clear dope, 25% retarder, and 25% Thinner. The metal parts can be painted a matching acrylic Enamel.

For striping, I only use Fine- Line Blue tape. It gives a crisp line. Only use masking paper- not

Hart Aero
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