

WEDELL-WILLIAMS TURNER SPECIAL

By Ron Peterka



ABOUT THE AUTHOR

At 61 years of age, Ron has spent most of his life in love with airplanes, and models in particular. He has built at least one of almost every type of model from solid balsa to rubber-powered indoor scale, control line, and free flight. Currently, his interest is in R/C scale of almost any size, but especially the Golden Age aircraft of the '30s. Currently retired, he worked at TWA and a jet engine overhaul facility for about seven years and then taught A & P Mechanics at Glendale Community College for 14 years.

One day each week is spent as a volunteer at the San Diego Aerospace Museum model shop in San Diego. At the museum, his first assignment was to design and construct a 1/4 scale display model of a ME 262. The model is displayed above a real Jumo engine exactly like those used in the real ME 262. Ron is a member of the Palomar R/C Fliers, the Poway Pilots R/C Club, and the National Assoc. of Scale Aeromodelers as well as the AMA.

Married to his lovely wife, Lila, for almost 42 years, they have three children and six grandkids. Ron's wife is very supportive of his hobby, but he hasn't been able to get her to solo yet.

A "Golden Age" Air Racer That's Also An Excellent Aerobatic Sport Flier

It was 1932 and the National Air Races being held at the Cleveland Airport in Cleveland, Ohio, looked like a real dog fight. It was the first (and only, it turned out) year for the fabulous Gee Bee R-1 and R-2 racers to race in the Thompson and Bendix races. The gull-winged Hall Bulldog was entered, as was Jimmy Wedell flying his No. 44 second place winner from last year's Thompson race. The always colorful Roscoe Turner was there with a brand new, and fast, No. 121 Wedell-Williams racer as well.

Turner's racer was sponsored by the Gilmore Oil Co. and sported a spectacular paint job done up in cream and red graphics advertising his sponsor's products. This racer came in third in this 1932 Bendix cross-country race from Glendale, CA to

Cleveland, OH, and Turner was anxious to try for a win in the 10-lap Thompson closed course pylon race. He was destined for disappointment.

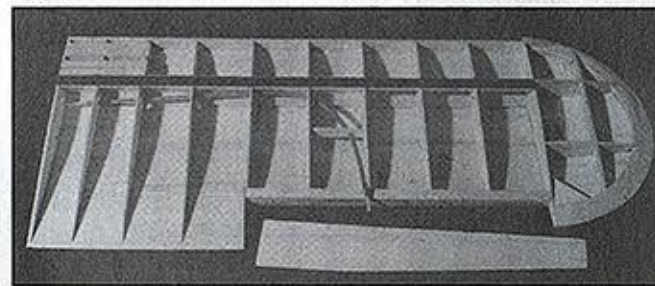
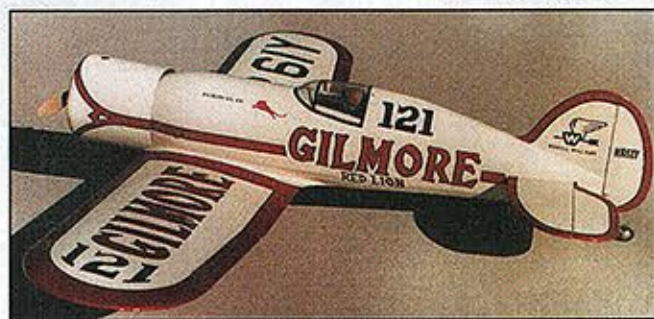
In the Thompson, Jimmy Doolittle, flying the barrel-shaped Gee Bee R-1 especially designed for the shorter closed course races, thundered past the field, shattered the speed record, and easily took first place at 252.87 mph. Second place went to Jimmy Wedell in No. 44 and Roscoe Turner had to settle for third place at a speed of 233.04 mph.

Jimmy Wedell was not only a truly great

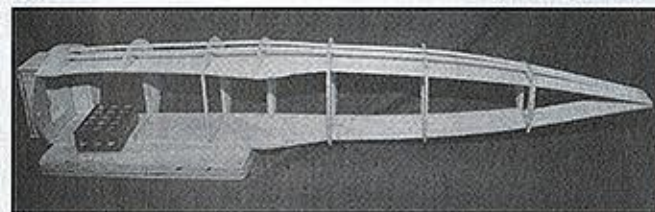
race pilot of his time, he was one of the most respected designers and builders of racing aircraft of the period of 1931 to 1936; that era known as the "Golden Era" of air racing. Wedell had only a ninth-grade education, could not read a blue print, and usually drew out the shapes for his planes on the hangar floor. They were the fastest, safest, and easiest to race aircraft around at the time.

He joined with Harry Williams, who supplied financing, to form Wedell's Air Service in 1928 so his aircraft were listed as Wedell-Williams.

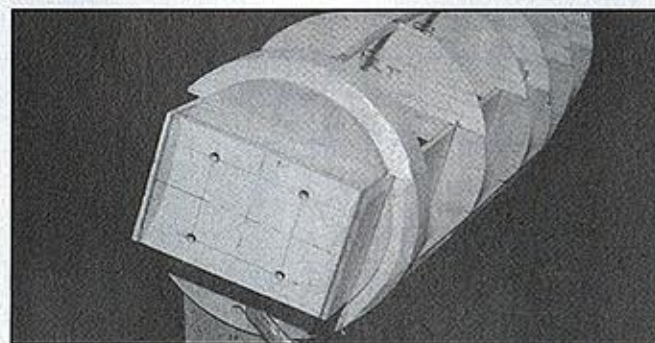
This model is a sport scale version of that Wedell-Williams Model 44 registered as NR61Y, flown by Roscoe Turner, and trimmed with the colorful and intricate Gilmore Oil Co. logos. Since it is not an exact scale replica, I chose a cream and metallic maroon color scheme on the prototype model,



Left wing panel showing installation of actuator flex housing, L/G mount, and aileron.



Fuselage showing initial construction steps. 3/4" spacer block provides clearance for formers on right side of fuselage.



Fire wall detail with engine mount blind nuts installed. 0° down and right thrust desired.

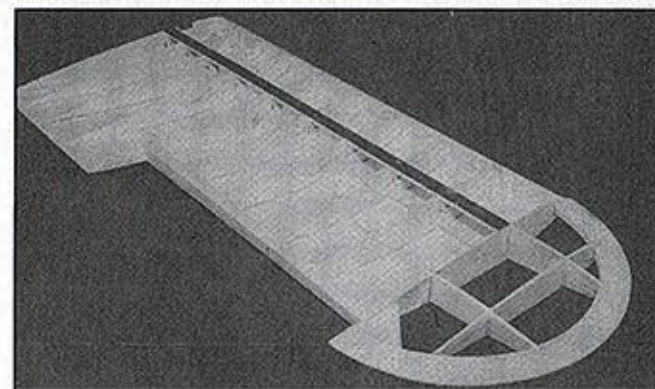
done entirely in MonoKote. The original was light cream and bright red and the second model was done in those colors, but you may have another preference. I also love the elegant landing gear leg-to-wheel fairing shape.

The model wing is slightly larger and thicker than the original aircraft, and the ailerons are larger to permit better aerobatics. The fuselage is slightly longer to get better moments and the tail surfaces are larger too. My prototype is powered with an O.S. .25 2-stroke engine, with a homemade muffler to allow an enclosed exhaust system. The second version has the same engine on its side with a commercial Pitts style muffler. The .25 engine

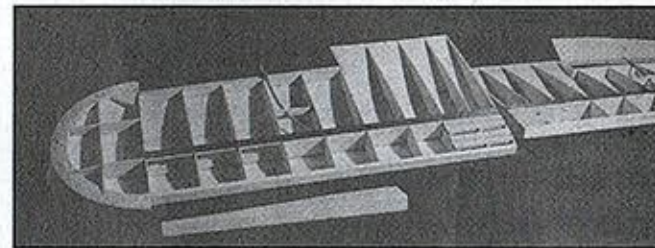
will be plenty for most pilots. The model gets along nicely despite its relatively large frontal area, since the completed model should weigh less than 4 lbs.

You should know right now that this model is designed for the builder who enjoys a challenge and loves the Golden Age air racers as I do. Building from plans takes more effort, time, and skill than building from a precut kit, but I think it really pays off in satisfaction when you get it right and make that first flight.

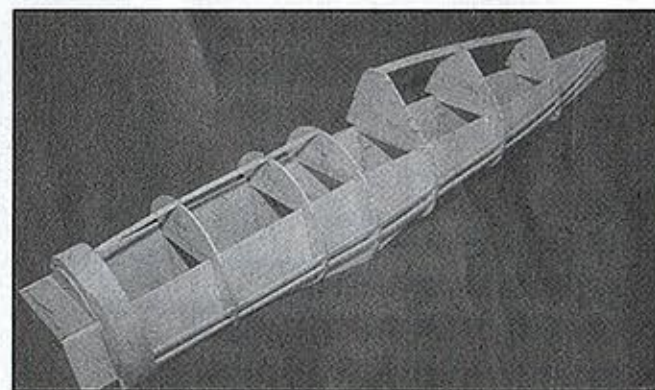
With the short nose moment, you need to think light on any part aft of the wing. Since



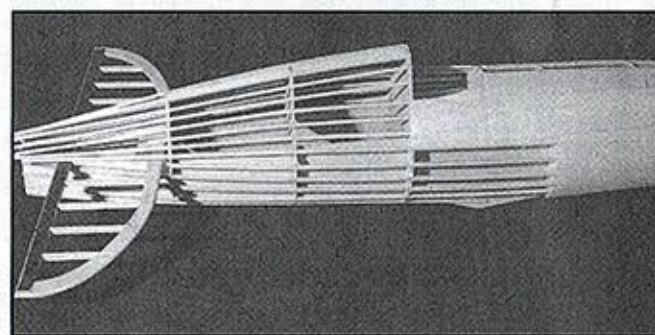
Left wing panel with most of the top sheeting applied. Ready for addition of actuator linkage, etc., and bottom sheeting. Note carbon fiber on bottom of spar.



Wing panels about ready for bottom sheeting. Hold-down filler blocks have not been installed yet.



Ready to start adding stringers and sheeting.



Right fuselage side showing general stringer and sheeting installation. Horizontal stabilizer is temporarily in place. Note carbon fiber reinforcement (optional).

this model is intended for modelers with some experience, I will not be giving a step-by-step description. Special areas will be covered in more detail. I like the idea of cutting most of the pieces before starting construction. Do not cut the 1/8" fuselage stringer notches until after assembly of the formers to the fuselage sides. Just mark the locations on each former for reference. Building seems to go much

WEDELL-WILLIAMS TURNER SPECIAL

Designed by:
Ron Peterka

TYPE AIRCRAFT

Sport Scale
WINGSPAN
44-1/2 Inches
WING CHORD
9-1/2 Inches (Avg.)
TOTAL WING AREA
420 Sq. In.

WING LOCATION
Low Wing
AIRFOIL

Semi-Symmetrical
WING PLANFORM
Straight-Round Tips
DIHEDRAL, EACH TIP

1-1/4 Inches
OVERALL FUSELAGE LENGTH
35-1/2 Inches

RADIO COMPARTMENT SIZE
(L) 4-1/2" (W) 5" (H) 3-1/2"
STABILIZER SPAN
16-1/2 Inches

STABILIZER CHORD (inc. elev.)
5-1/2 Inches (Avg.)

STABILIZER AREA
90 Sq. In. (Approx.)

STAB AIRFOIL SECTION
Flat

STABILIZER LOCATION
Mid Fuselage

VERTICAL FIN HEIGHT
5-7/8 Inches

VERTICAL FIN WIDTH (inc. rud.)
6-5/8 Inches (Avg.)

REC. ENGINE SIZE
.25-.28 2-Stroke

FUEL TANK SIZE
6 Oz.

LANDING GEAR
Conventional

REC. NO. OF CHANNELS
4

CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.

C.G. (from L.E.)
3 to 3-1/4 Inches

ELEVATOR THROWS
1/2" Up — 1/2" Down (High Rate)

AILERON THROWS
1/2" Up — 1/2" Down (High Rate)

RUDDER THROWS
3/4" Left — 3/4" Right

SIDETHRUST
NA

DOWNTHRUST/UPTHRUST
NA

BASIC MATERIALS USED IN CONSTRUCTION
Fuselage Balsa & Ply
Wing Balsa, Hardwood, Carbon Fiber
Empennage Balsa & Carbon Fiber
Wt. Ready To Fly 64 Oz. (4 Lbs.)
Wing Loading 22 Oz./Sq. Ft.

faster with precut pieces handy.

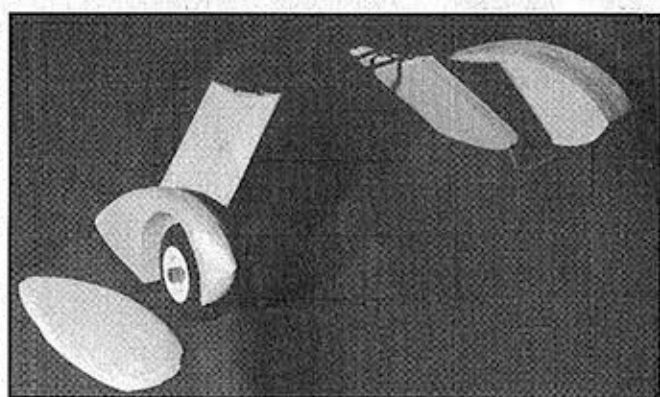
CONSTRUCTION

Wing:
I start construction with the wing. It is built in two panels over the plans and joined at the center as usual. Start with the bottom 1/8" x 1/2" main spar and locate the ribs W-1 to W-4 on the spar. On my models, the wings were entirely sheeted with 1/16" balsa with

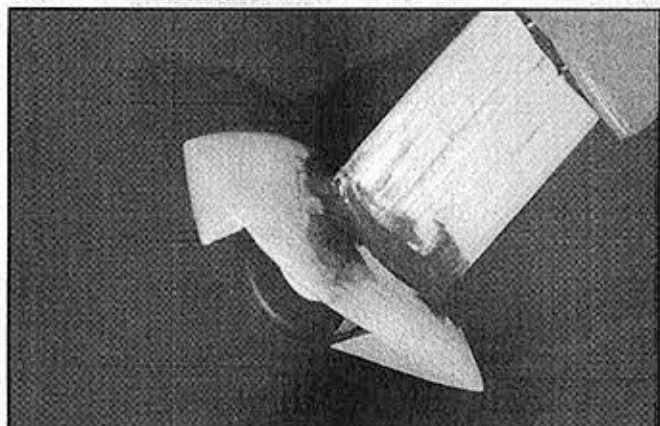
0.007" carbon graphite reinforcement between the skin and the top and bottom spars. This is probably overkill, and if you want even better performance you could just capstrip the ribs aft of the spars and save some more weight. The tabs on the ribs should give about 2° of wash-out at the tips, and partly by carving the aileron bottom surface.

Add the top spar and the 3/16" x 3/4" sub-leading edge. Install the 1/2" balsa aileron support and the 1/4" scrap balsa spacer inboard of the aileron. Add the 1/16" vertical grain balsa and plywood webs as shown on the plans and the top 1/16" wing covering from the spar over the subleading edge. The wingtip bows can be simple balsa pieces, or sandwich a piece of 1/32" ply in the middle. I like my tips hardy since they tend to take quite a beating when I fly. Finish sheeting the top of the wing and then lift the wing, trim the building tabs, and carefully sand the trailing edge, beveling the edge to match the bottom chord contour. Use a long sanding block to sand in the wash-out, fairing the lower surface from the lower spar smoothly to the trailing edge. Install the hold-down block filler. Now is the time to plan and install your favorite actuator system using flex cables or pushrods and bellcranks. No slop! Use your favorite method to mount the aileron servo in the center section of the wing. The landing gear mount is made up with a sandwich of 1/8" ply pieces or 1/4" x 3/4" hardwood blocks. I epoxied the gear into place after MonoKoting the wing.

When you install the bottom sheeting, you will have a nice strong trailing edge with a



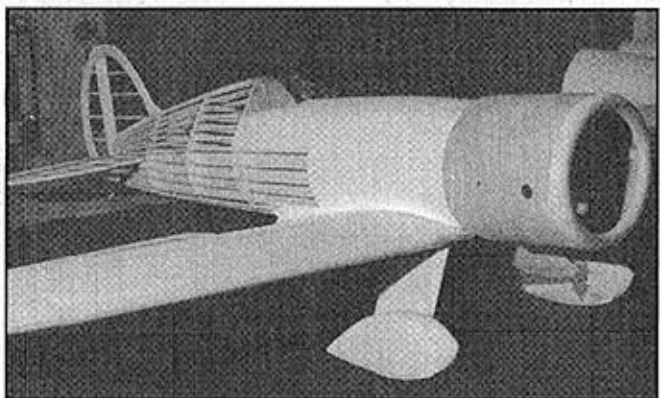
Landing gear, fairings roughed out. Carve, sand, and fair as shown on right wheel in photo. 2-1/4" dia. Williams Bros. wheels.



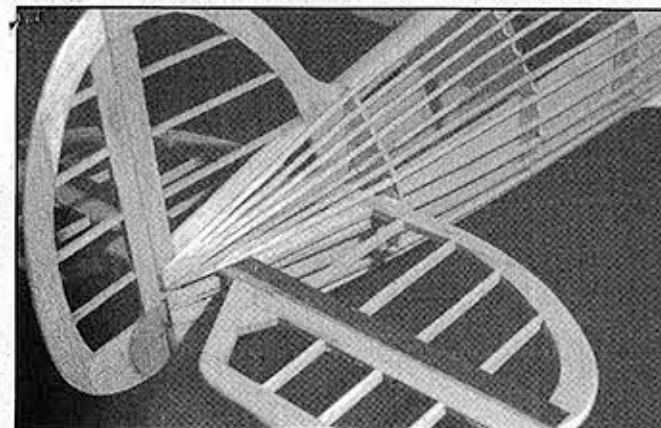
Detail of fillets on pant to gear leg fairing. Use epoxy mixed with phenolic micro balloons for fillets. Easier to sand than other fillers.



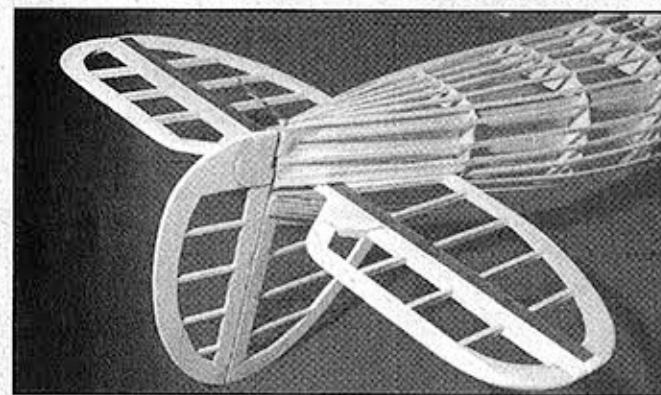
Cowl 1/32" ply being glued to 1/8" ply former. 1/2" balsa nose fairing ring in foreground to be glued on next and sanded to shape.



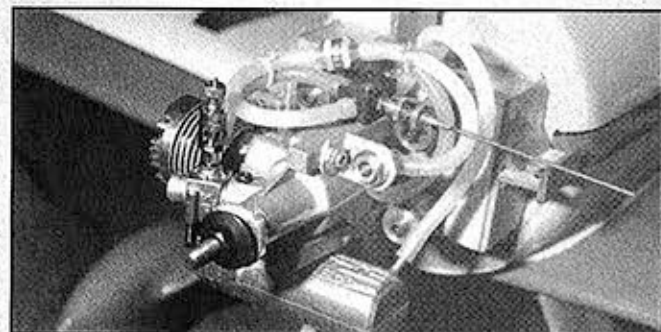
Almost ready to cover. Gear is not glued into place at this time. Note the 1/32" ply wing mount fairings and small fillets.



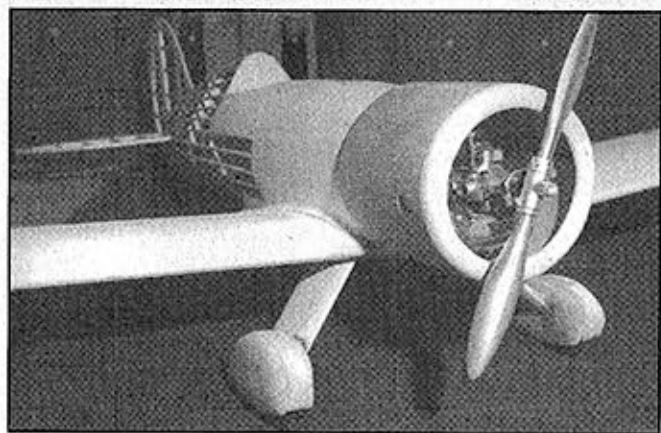
Detail showing stringers fairing into vertical fin and horizontal stabilizer area. At this point, vertical fin is glued in place, but horizontal stab can be removed for covering. The elevator hinges have not been glued yet.



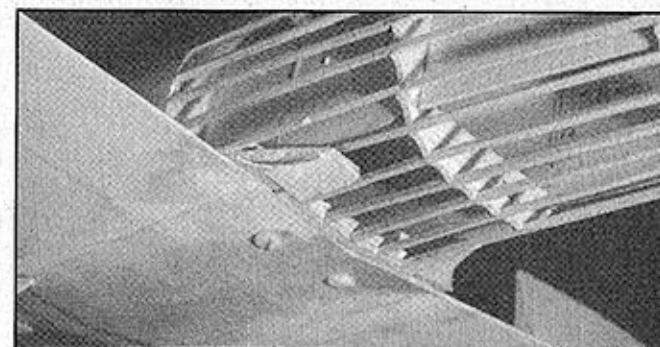
Rear bottom and tail wheel detail. Original plane had a fixed skid fairing to fuselage.



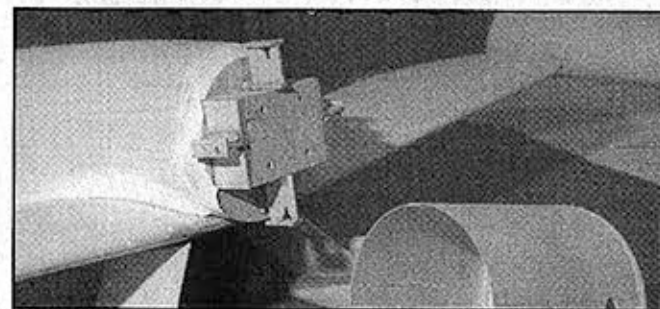
Engine mount detail showing Du-Bro quick fill valve and Varsane remote needle valve installation. J'TEC Pitts style muffler used here.



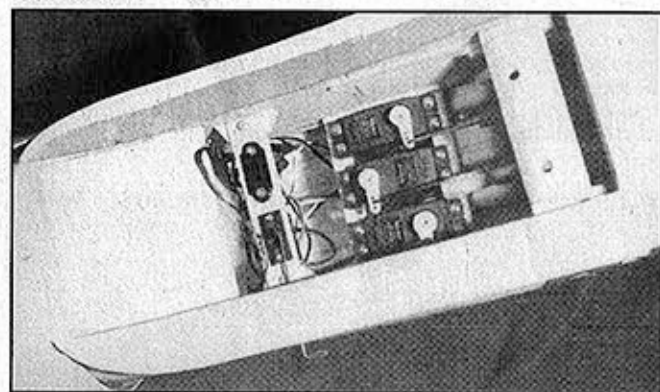
Ready for final sanding and covering. Prop shown is for display only and is made up of dowel and balsa parts.



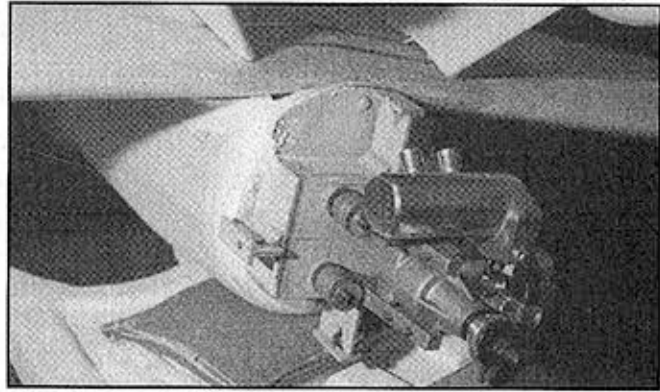
Detail showing lower wing to fuselage fairing. Scrap balsa filler fairs wing to fuselage using 1/32" ply wing saddle for shape.



Engine mount and cowling detail. Four 1/8" ply T's mount cowl to fuselage with maximum airflow for cooling.

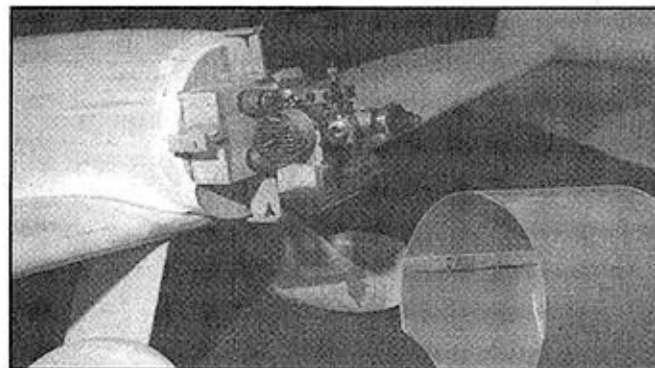


Servos mount high in fuselage. Receivers and batteries behind the switch and charging receptacle plate. Battery and receiver wrapped in foam for vibration protection. Try to get battery above tank and as far forward as possible for balance.



Front view showing Du-Bro vibration damping mount and J'TEC muffler. Use of this mount requires moving fire wall aft approximately 1/4" when building fuselage.

uniform edge. After sheeting the entire wing panel, trim and sand the sheeting flush with the subleading edge, add the 3/8" x 3/4" leading edge block, and carve to shape. Join the wing panels with 2-1/2" total dihedral. No center section wing joiner is used so the fiberglass and epoxy reinforcement is critical. Use 3 oz. fiberglass and epoxy or CA



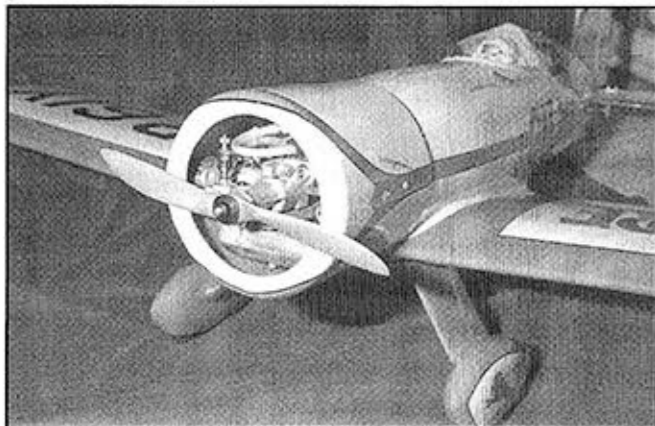
Engine mount and cowl details. Paint inside of cowl and mount with epoxy thinned with isopropyl alcohol for fuelproofing.



1" wide strip of Frisket paper is used to hold lettering in alignment and in place on wing. Use a trim iron at lowest setting needed to activate adhesive to "tack" letters in place on wing. Carefully remove Frisket paper tape and finish adhering letters to wing using low heat iron or sparingly apply no-heat liquid activator fluid.



Gotta have a pilot. Cockpit trim is ironed-on after canopy is glued in place.



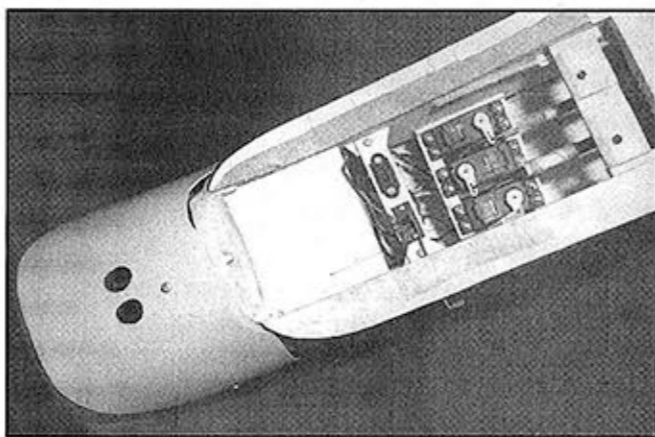
3/4 front view showing wheel pants and cowl detail. Note the remote needle valve extending out of cowl above the trim stripe.



Cut each letter using a pattern Xeroxed from the plan. Bond to black MonoKote and trim for approximately 1/16" pinstripe. Align letters on glass over pattern under glass with tabs of masking tape. Apply Frisket paper strip across center of letters to hold letters in alignment for application.



Graphics detail showing all MonoKote trim. Aileron is hinged at top surface with MonoKote for airtight seal. Pinstriping is sandwiched between main and trim color covering using lowest heat needed to activate the adhesive.



The servos mount high in the fuselage as far forward as possible.

to reinforce the center section. If you stretch some kitchen wrap over the wet epoxy/glass after application, the surface will be smooth and require minimal sanding to fair it in.

Hinging the ailerons from the top surface (I used the MonoKote covering) seals the gap and will give a small amount of aileron differential.

The wing alignment dowel and hold-down bolt holes will be put in as you join the wing to the fuselage.

The gear is hard-soldered together using 1/8" dia. music wire with brass or copper wire wrapping. The gear axles should have a very slight toe in (front 1/32" closer together than the rear) and slight positive camber (top of wheel tilts away from the centerline of the fuselage). The gear will be quite stiff and a good landing technique will prove to be important for the model as it was in the full-scale aircraft.

Start construction of the wheel pants and L/G fairings by fitting three layers of 1/8" balsa around the gear legs to match the plans, with a

little clearance at the wing surface for flex and a little extra material at the lower end to fair into the pants. Carve the sandwiched layers into a streamlined shape.

The pants are made up of layers of balsa with a cut-out for the 2-1/4" dia. Williams Bros. wheels. Tack-glue the outer layer(s) to allow carving and then removal of that outer piece for installation of the wheels. I like the multiple layers because it seems easier to match and fair the part. Glue the pants to the leg fairings and fill the joint with an epoxy filler to fair the legs into the pants smoothly. After the main part of the pant is installed, the wheels can be installed and the outer layer of balsa glued in place. I installed the landing gear permanently after MonoKoting the wing panels, then I put a small piece of covering over the slot and the gear wire to cover them neatly.

Horizontal Stabilizer and Vertical Fin:

These are built up using a 3/16" thick balsa horizontal stabilizer and 1/8" thick vertical fin for a very light construction. Here again, I used the 0.007" carbon fiber on the top and bottom of the main spar for the horizontal stabilizer. For the best "look," you'll have to either fair the carbon with filler, sand the main spar a little thinner, or make the other pieces a little thicker. The elevators are coupled with a simple 3/16" dia. hardwood dowel, and control horns are mounted on ply reinforced areas on the rudder and elevator. Here I used conventional hinges, but you can use your favorite. Consider using stiff balsa or fiberglass push-pull rods or plan on supporting flex housings in several places to eliminate slop. Remember, this is a scratch-built project and you can feel free to change any detail you please if you think your way is better.

Fuselage:

Back to an old standard technique. Lay out and assemble left and right fuselage sides to build a nice square box. If you plan to use a vibration damping mount like the new Du-Bro unit, you may have to shorten the fuselage sides by about 1/4". Epoxy F-1 and F-2 in place on one side perpendicular to that side and epoxy in the 1/8" ply filler between them as shown on the plans.

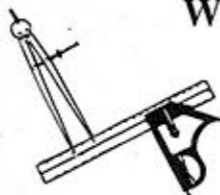
I laid one side on a flat surface and epoxied the second side in place using a square to align the horizontal stabilizer mount surfaces. After the epoxy sets up, you can weight or pin the front of that side to a flat surface and measure up 1/2 the fuselage box width, bend the aft end of the lower side of the fuselage up to that height and block it parallel with the table surface. Join the tail ends and you should have a straight and true fuselage box to add to the top portions of the formers.

Add the former pieces and the cockpit floor. Glue the aft top former F-8 in place. I sand in each stringer notch as I install that stringer (1/8" x 1/8") using a piece of 1/8" x 1/2" hard balsa with 180 to 220 grit sandpaper glued onto the narrow edge. A few strokes and you have a notch just where you want it. Align and match the stringers as you install them, working from side-to-side to avoid pulling the fuselage out of line. Leave

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the upper stringers loose at the tail end of the fuselage to be trimmed and glued later to the vertical fin. When all the stringers are in place, you can use a sanding dowel to scallop out the portions of the formers between each stringer except on F-4 where it forms the aft edge of the cockpit.

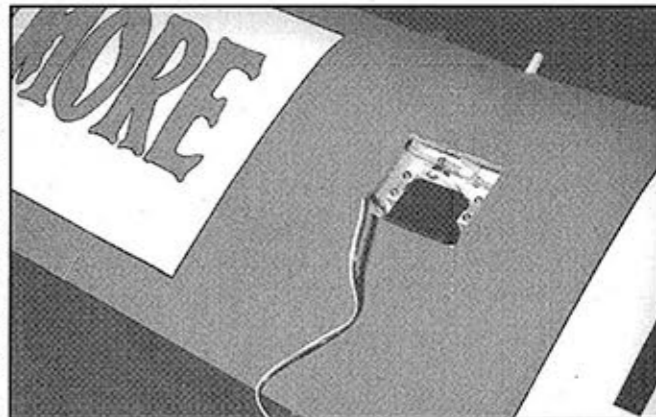
Add the 1/16" sheet planking over the stringers on the forward sections and use approximately 3" long pieces of 1/16" x 1/8" balsa to fair the edges of the sheeting into the aft stringers. Install the 1/4" ply wing hold-down plate (no holes yet).

Carefully trim the planking and fit the wing onto the fuselage. Drill the wing leading edge for a 1/4" dowel through the fuselage former F-2. Locate, drill, and tap the wing mounting plate so you can hold the wing securely in place. Cover the wing center section with Saran Wrap or wax paper and glue in the 1/32" wing fillet plates. I used Model Magic filler to form the minimal fillets between the plates and the fuselage planking. Coat the fillets with CA after they are sanded to shape.

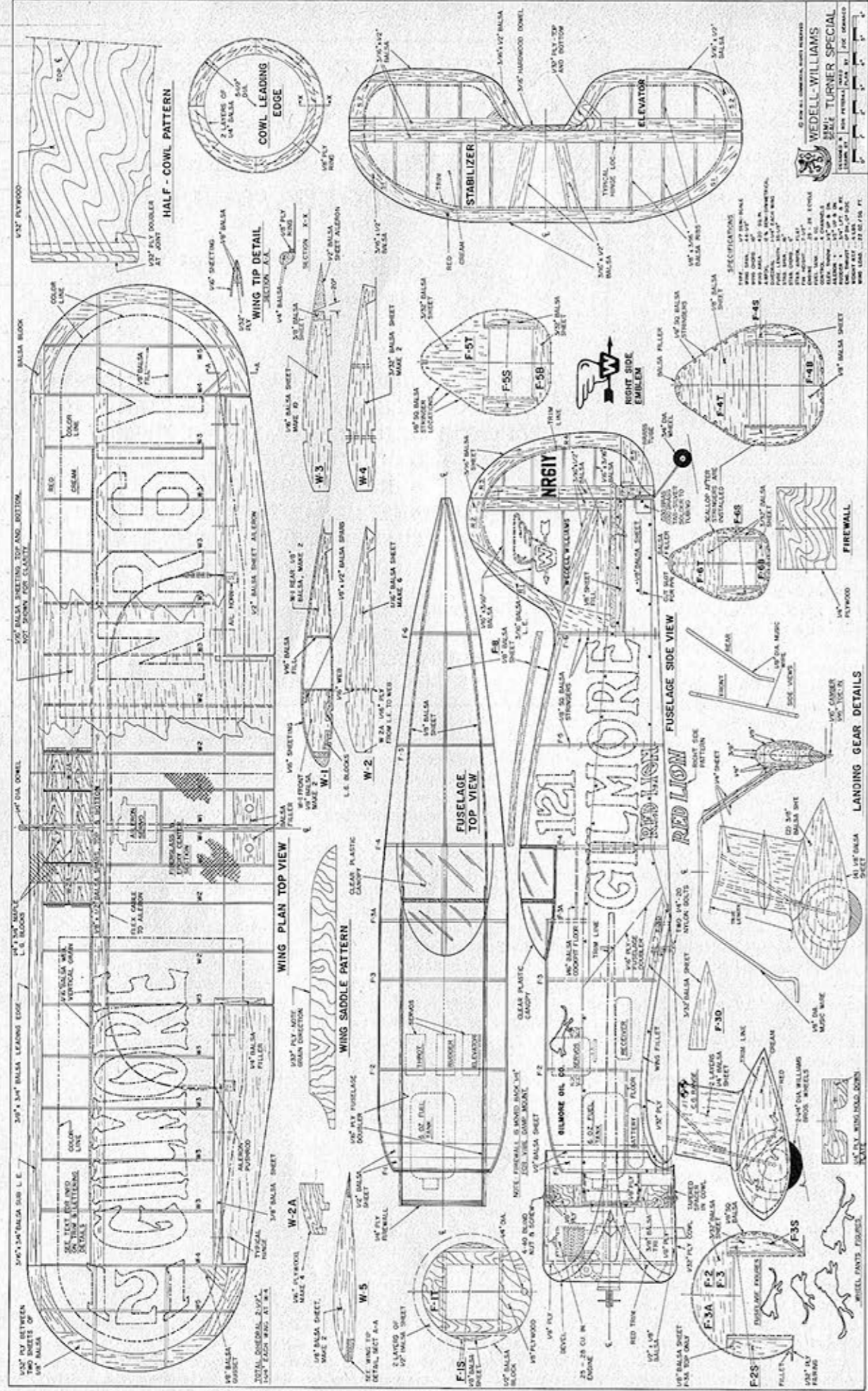
With the wing in place, fit and glue the horizontal stabilizer in place, square with the

wing. Glue the vertical fin in place and then trim the stringers to fair into the vertical fin. Add a little balsa sheet filling above and below the horizontal stabilizer to make covering easier and around each control rod exit at the tail. Some additional balsa sheet filler on the fuselage at the wing trailing edge to fair in there and you should be about ready to sand the fuselage using a large sanding block to smooth everything down for covering.

The cowling is tapered smaller at the aft edge than at the leading edge and is fairly easy to form using 1/32" ply and balsa. It could be done using a turned foam form covered with epoxy/fiberglass and then remove the foam. I like the ply! The ply I bought had the grain in the wrong direction to cut a single piece for



Aileron servo installation. A simple 1/16" ply plate with 1/4" square posts cradles the servo, with screws and landing gear straps securing the servo. The servo is easily installed/removed.



WEDELL-WILLIAMS
 TURNER SPECIAL
 1/8" Balsa
 1/16" Ply
 1/32" Ply
 1/4" Ply
 1/2" Ply
 3/4" Ply
 1" Ply
 1 1/2" Ply
 2" Ply
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 1000" Ply

PLAN NO. 1230

the cowl, so I used two pieces with a ply joiner in the center. Trial fit the 1/32" ply around the 1/8" ply former ring and adjust to fit. The aft diameter should be about 1/4" smaller than the leading edge. When it fits, glue the 1/32" ply to the ring former and then add the sections of 1/4" balsa to the leading edge. Carve and sand the leading edge to shape. Believe it or not, the cowl can be neatly covered completely with just three pieces of MonoKote.

The cowl is mounted to the fuselage using four 1/8" ply "T" standoffs mounted on the fuselage with 4-40 blind nuts. 1/8" x 1/2" balsa stringers are glued into the cowl from front to back with a tapered 1/32" filler in the area where the 4-40 screw goes through the cowl. The spacer is needed so the cowl can slide on straight. This is a good time to install the engine/muffler and cut exhaust holes, glow plug access holes, and a needle valve hole. I didn't put a needle valve hole in the original because I find little reason to change the setting once it is right. Adjust the engine with the cowl off and then make minor changes needed by shutting down the engine and tweaking the needle. It's a little more trouble, but a lot neater. In the second version, I added a remote needle valve since the weight helps up front.

Covering and Graphics:

MonoKote was used on both the originals because I am comfortable with using it and my experience has been good. Using light cardboard templates, I first covered the wings with the two colors with a 1/4" overlap at the pattern. The trim designs are shown on the plans with dotted lines. The fuselage gets completely covered with the cream MonoKote. The horizontal stab and vertical fin get two colors using patterns to overlap. I don't care too much for using trim tape so I laminated a narrow section of black MonoKote under the red and trimmed for a 1/16" exposure before application on the model. If you remove the backing and smooth down a strip of black MonoKote on glass and lay the color over it, ironing the edge will not cause the MonoKote to stick to the glass permanently.

The "Gilmore" lettering is cut by removing the backing layer and laying the red MonoKote out on a piece of glass. A pattern is then placed over the MonoKote and the pattern and MonoKote cut through. (I Xerox off several copies of each pattern.) Each letter is then applied to a piece of black MonoKote using low heat or the solvent activator and the pinstripping cut around the edges. No tape will go around the corners.

Using another copy of the pattern under the glass, lay out the letters and apply a 1" wide strip of Frisket paper over the top of the lettering. Frisket paper is a clear, low tack, adhesive backed paper available at many art supply or office supply stores.

Lifting the Frisket paper and lettering sandwich off the glass, you can now position the whole graphic in place on the wing or fuselage and again use the lowest heat possible, or the liquid solvent (very sparingly) you can tack the graphics in place. Carefully removing the Frisket paper you can then

finish sealing down the graphics. I made the stripes the same way. The single-color graphics are applied using the Frisket paper method for accurate alignment as well.

The logo on the tail was cut just through the film from adhesive backed trim film using a Xerox pattern and then the excess trim film was removed. Frisket paper again lifted the whole pattern in one piece. A little water/detergent sprayed on the surface allows positioning and squeegeeing the logo in place and then carefully pulling back the Frisket paper to finish the application. The red lions were done this way also. The lettering on the fuselage in front of the cockpit and the tail "N" number were made using "rub off" lettering onto pieces of MonoKote matching the fuselage color, the lettering was then fuel-proofed by covering with a layer of clear MonoKote and the trimmed sandwich ironed in place using the lowest heat possible to activate the glue without making bubbles. You could contact Dry Set or a local sign maker with computer graphic services to make your graphics out of vinyl or you could choose a somewhat simpler pattern to copy. Jimmy Wedell flew a nearly identical aircraft with a simple red and black color scheme (NR278V, race No. 44). There is a great photo of this aircraft on the cover of the softback "Thompson Trophy Racers" by Roger Huntington which is available at aviation bookstores. Or you can design your own graphics.

The canopy was pulled using a simple wood mold and my kitchen oven. A commercial canopy could easily be cut down for this

model. Don't forget the pilot. I can't stand seeing a scale model flying without a pilot!
Flying:

Be sure the balance point is at least as far forward as noted on the plans, about 3" to 3-1/4" back from the leading edge. Both prototype aircraft required a couple of ounces of lead weight attached to the fire wall assembly to get balanced correctly. The first flight was almost the last when I launched with a slightly aft C.G. The aircraft was extremely pitch sensitive and my very talented test pilot, Ken Phelps of the Palomar R/C Fliers, was barely able to land the plane safely. A couple of ounces of lead attached to the engine mount and the plane became a real pleasure to fly. For first flights, set up with about 1/2" throw each way in the elevators, about 3/4" throw in the rudder, and 1/2" up and down on the ailerons. These would be "high rate" if you have dual rate capability on the transmitter. Double check everything and, when you can't find any reason not to fly, go ahead and fly it.

If built under four pounds, the model will do most aerobatics quite nicely. I sure can't, but with a better pilot, this model can. Landings should be as smooth as possible because the gear is quite stiff.

I hope you enjoy your model as much as I have enjoyed mine. It would be pleasant to hear from any modeler (at P.O. Box 63, Ramona, CA 92065) who builds this model, and I am on-line with America On Line as Ron3180 for email.

