GP-4 BUILDERS & FLYERS NEWSLETTER

May 2005
GP4BFN 47

News for Builders of Fast Wooden Aircraft !

HYDRAULIC GEAR PLANS NOW AVAILABLE

As you look through your plans, you will note that the GP-4 has a manual landing gear retraction system. The manual system has worked very well, but I received feed back from builders asking if I would develop an electric hydraulic gear for the GP-4.

I spent about a year of research to design and build a working mock up that I feel has all the amenities to do the job. It has since been flight tested and it works well.

all the push rods, bellcranks, and the air drive uplock system.

The advantages of the hydraulic system are obvious. Flip a switch, and fly the airplane. Less parts to build, and you get the Johnson bar out of the cockpit. Disadvantages? Possible electric hydraulic failure, approximately 5 to 6 more pounds weight, and maybe some more expense. And, the F.A.A. requires a back-up system, even in a homebuilt. This system has

Both systems have advantages and disadvantages. The manual system requires no redundant back up to get the gear down. It is all mechanical, the F.A.A. feels it is fail safe. Its less expensive if you build your own parts. The main disadvantage is muscling the Johnson bar between the seats about 90° to get the gear up right after take off. There are also more parts to build,

an excellent emergency back-up, consisting of a mechanical cable uplock release and nose gear extension. It is both simple and foolproof.

No machine work is required for any of the components. Plans are available for $150.00 from Osprey Aircraft. You can find the address and an order form at www.ospreyaircraft.com.

George

NEED HELP?

Have a question, idea, or is there something you don't fully understand?

There are currently about 525 sets of GP-4 plans in builder's hands. Of course, its impossible to know how many builders are active, but we can hope :)

Help / answers / advice is only a phone call or note away. Please remember to include your plan serial number when you write, it helps to locate your mailing address.

Write or call:

George Pereira
Osprey Aircraft
3741 El Ricon Way
Sacramento, CA 95864
Ph: 916.483.3004
Fax: 916.978.9813
Email: gp-4@juno.com

GEORGE'S CORNER

BY GEORGE PEREIRA

Fellow GP-4 builders:

I have received several inquires on the status of the GP-5 since it was featured in our newsletter Volume 14, May 1997. For those interested there is also an article in the May 1993 issue of Sport Aviation.

The GP-5 was never designed as a plans for sale project. It was designed as a one shot build to compete in unlimited air racing. It has set in limbo since 1989 for too many reasons to mention here. The unfinished airframe was purchased by a local business man, George Backovitch. George, as a one time hot rodder and boat racer, has used his expertise to build up a 494 cubic inch aluminum block V-8. He used a HY-VO chain drive for a reduction drive to keep the prop tips under the mach. If we can keep it cool the 500+ h.p. should give pretty decent performance to the GP-5's very clean airframe.

Dave Morss, who races sport and unlimited racers is interested in flight testing. Dave and I have fast taxied the GP-5. The acceleration is unbelievable. No flights yet. Just couldn't keep it cool. Hope to flight test this summer after extensive modifications.

<u>GP-5 specifications:</u>

Basic wood construction

Gross weight: 1900 lbs.
Empty weight 1400 lbs.
Fuel: 52 gallons, Oil 14 quarts, Wet sump
Wing area: 75 sq./ ft.
Wing span: 22'2"
Span loading 86 lbs.
Wing loading: 25.3 lbs. sq./ft.
Length: 23'2"
Airfoil: Laminar 66 series
Engine: After market aluminum block, 494 cubic inch V-8

GP-4 Component Venders:

Normal retract only: Air cylinders ARO 5507 P484-020 Available Ind,-Tech phone 209-529-2888

Canopy and Windshield: Airplane Plastics Company. 9785 Julie CT., Tipp City, OH 45371

Pitch Trim Motor: The Ray Allen Co. phone 760-599-4720. 2525-8 Pioneer Ave. Vista, CA 92081

Engine Dynafocal Mounts: P/N EM 100-005
Wicks Aircraft or Aircraft Spruce.

Prop Governor: Woodward 210681 or equivalent for Hartzell and IO 360A series Lycoming.

Good place to look for used engine as well. Trade-a- Plane subscription. phone - 800-337-5263

Electronic Ignition: Light Speed Engineering, (Klaus Savien) phone 805-933-3299.

Oil Cooler: Niagara Air Parts Inc. phone 800-565-4261, 99 Porter Rd., Niagara Falls, NY 14304

Jet Hot exhaust coatings, phone 800-432-3379. 55 East Front St. Bridgeport PA 19405. Recommended for mild steel GP-4 headers.

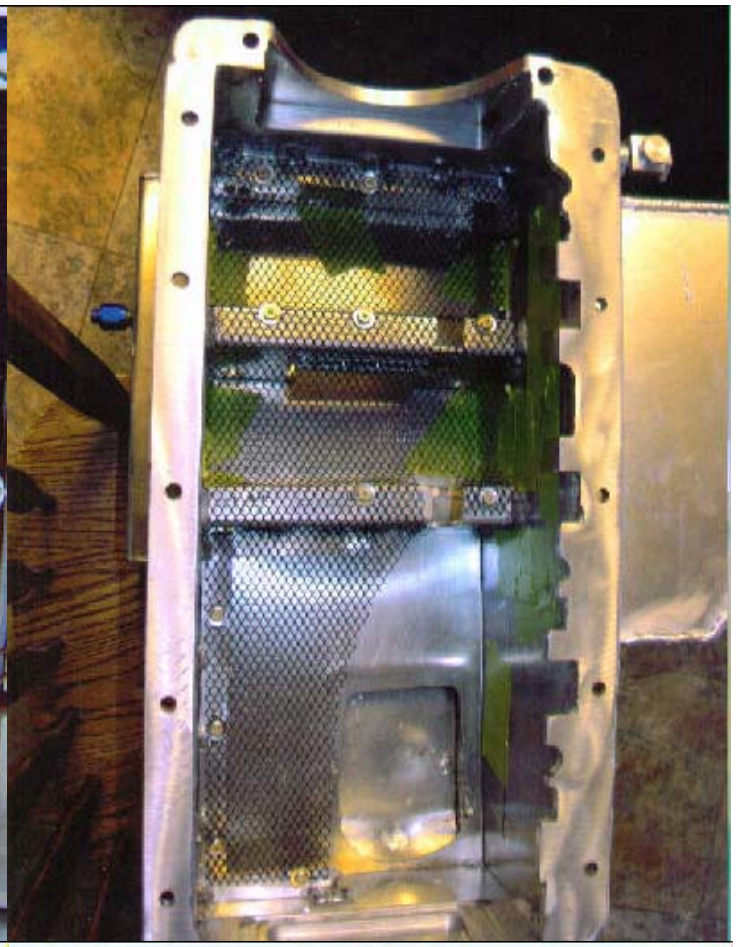
Current Price of Recommended propeller and assembly. Prop.$5,906, spinner $696, FOB OH. Available Osprey Aircraft. About 2 months delivery.

Please note: To all GP-4 and Osprey 2 plan holders, Sirius Aviation is not an authorized dealer for plans, parts, or material. No verbal or written authorization has ever been given to Sirius Aviation from George Pereira or any member of Osprey Aircraft to distribute plans, parts, or material for the GP-4, Osprey 2, or Osprey 1 aircraft. George Pereira

Regards to all,

George

GP-5 PICS



BUILDER'S UPDATE

THE CANOPY INSTALLATION

BY MIKE TRAUD, GOLD RIVER, CA

The Canopy – Part one of a three part series.

The first two parts of this series are reprinted and updated from the GP4BFN volumes 36/37 (early 2001) and volumes 39/40 (late 2001). The third part of this series completes the canopy fabrication and installation and has never been published.

(pictures begin page 8)

The canopy on the GP-4 can be somewhat intimidating from a fabrication point of view because of many factors. These include the cost of the canopy (approximately $1,500 in 2000), the size and shape of the structure, and the complex fairing required to ensure a nice smooth fit to the fuselage. This series is intended to walk the builder through the process of fabricating the canopy from start to finish in a manner to simplify the process. Please reference and become familiar with Plans Drawings 41, 46, 47 and 49.

Like virtually every aspect of the GP-4, the canopy design was done with purpose and performance in mind. It is a sliding structure that provides excellent visibility, ease of cockpit ingress and egress (i.e. getting in and out) and withstands approximately 400 pounds of lift force upon it when cruising at 200 plus knots (which is where you'll find yourself when flying this little hummer).

Where to purchase your canopy….Most builders I have run across are acquiring their canopies in Ohio. (*Airplane Plastics; 9785 Julie Court, Tipp City, OH 45371; 937-669-2677.*) This organization specializes in custom canopies for many aircraft, including military applications. They know the business and handle each canopy order in a first class fashion. I purchased my canopy from Airplane Plastics and was very impressed with the quality and finish of the product. It takes about four to six weeks to receive your canopy from their facility in Ohio, so plan ahead. (Keep in mind that this time frame was back in 2000, so it could be different now.)

Airplane Plastics gives you a warranty that provides you for six months from the date you receive your canopy, half price off a replacement if you botch the first one during the fabrication process. Hopefully that won't happen, but it is good to know you're not out the entire amount if a mistake occurs. There are other options for canopies which can be found in the back of *Sport Aviation Magazine*. One such company is *Thermo-Tec; 530-272-2556.*

The drawings (41; windshield, 47; canopy) call for a canopy thickness of 3/16 inch, and a windshield thickness of 3/16 inch. The prototype aircraft utilizes these thickness and they work very well. However, if you want to reduce wind noise, utilizing ¼ inch for the windshield is an option many builders have chosen. (Note: Particular attention must be paid to canopy and windshield thickness in order to achieve a flush fit at the canopy/windshield juncture.) This series will address canopy fabrication using a ¼ inch windshield.

Early GP-4 canopies were not quite uniform in thickness due to the stretching involved in fabrication. Keep in mind the canopy used on the GP-4 is derived from the Thorp T-18 which has a narrower cockpit than the GP-4. So, in order for it to fit properly, the GP-4 canopy had to be stretched during fabrication resulting in thinner plexiglass at the top and thicker plexiglass at the sides. This does not pose any problems or complexities during construction. (The folks at *Airplane Plastics* have become very adept at fabricating GP-4 canopies to the extent that very little thickness variation exists in the finished product.)

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THE CANOPY INSTALLATION

BY MIKE TRAUD, GOLD RIVER, CA

Moving on to the fabrication process – herein we will discuss fabrication of the canopy and assume your fuselage and fuselage canopy base (apron) and all top fuselage skins are in place. Given this level of completion, the first step is to construct the 1/8 inch mahogany ply canopy skirt base (reference drawing #47).

Here is where some advance planning is required. As you lay out the skirt base, keep in mind the thickness of the canopy plexiglass and the outside fiberglass lay-up. By constructing the skirt base slightly narrower than the fuselage canopy base (apron), you will end up with a nice, close tolerance fit between the canopy and fuselage without having to utilize much foam and glass during the fairing-in (i.e. fit and finishing) process. Specifically, the skirt base should be narrower by the width of the canopy plexiglass and associated outside glass lay-up. This translates to approximately ¼ inch less thickness in the skirt base (3/16 inch for the canopy plexiglass plus the outside lay-up which is approximately 1/16 inch). The skirt base is constructed as per drawing #47. If you need to scarf the ply to complete the skirt base, remember to utilize a scarf joint of 10 to 1. Concurrent with the fabrication of the skirt base, you'll need to build a canopy jig (reference drawing #47). For my project, I built the jig per plans except for using additional vertical supports.

Once the canopy jig is complete, you now can place the 1/8 inch mahogany canopy skirt base on the upper surface of the jig structure, level it and prepare for glassing the inside canopy skirt. The procedure for glassing the skirt is detailed on drawing #47. Here is how it goes: First, secure the 1/8 inch mahogany ply skirt base on the canopy jig and ensure it is linear (i.e. flat) all the way around. (This will be a piece of cake as long as your canopy jig is dead level. This is important because you want the canopy to slide *evenly* along and across the fuselage canopy base (apron) without contact between the two surfaces.) Once the 1/8 inch skirt base is secured on the jig, you now can attach the ¼ inch thick (or so) masonite or equivalent forward canopy jig at 98 degrees. This part of the jig maintains the canopy shape at the forward end while you fabricate the glass inside skirt.

Do you have your canopy yet? Good, because now is when you place the canopy on the canopy jig to form the "mold" for the inside canopy skirt. At this juncture you can trim a *little* excess plexiglass off the canopy to reduce its size. However, if you trim during this phase of the process, it is important to be conservative and leave a fair amount of plexiglass for final trimming (when the structure is on the fuselage). Once you get an idea of how the canopy fits on the skirt base (on the jig), you can remove it and install duct tape (I used two layers of tape here) on the inside canopy surface where the fiberglass will contact the canopy plexiglass. You can also choose to protect the remainder of the inside surface of the plexiglass with either the plastic film that came with the canopy or a product called *Spray Lat* (available from *Wicks Aircraft Supply*; (800) 221-9425).

Speaking of protecting the canopy, it is a good idea to protect the entire canopy with the included plastic film or *Spray Lat* during the fabrication process. The last thing you want is to scratch your canopy and have to buff it out. One last item before you lay up the glass for the inside skirt: You'll need some mold release compound to better allow the canopy to be removed after the glass inside skirt has cured. This is a wax product usually available at plastic supply stores. The stuff I used is called *Tap Wax Mold Release* and is available from

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THE CANOPY INSTALLATION

BY MIKE TRAUD, GOLD RIVER, CA

Tap Plastics in Sacramento, CA (916) 481-7584. Apply the mold release compound on the surface of the duct tape and re-install the canopy on the jig structure.

Take extra care to ensure the canopy is positioned and fitted closely to how it will be on the fuselage. Clamp it down on the lower edges. Using 4 plys of 8 oz. Glass cloth with a 45 degree bias, cut into lengths of approximately 18 inches and thoroughly wet with resin, carefully apply to the inside of the canopy and skirt base using aluminum foil to assist in handling of the wetted lay-up.

Press out any bubbles before you peel off the foil. (Note: You initially lay out the cloth strips on the foil and wet them up as you "build" the 4 ply lay-up. Once the 4 ply lay-up is fully wetted with epoxy, you can easily lift this and apply it to the inside canopy surface and skirt base, keeping every thing intact. No sweat.)

Make sure you over lap the lay-ups by 4 inches or so. If you want, you can also perform two separate lay-ups of 2 plys each during this process, *as long as you do not allow the first two ply lay-up to fully cure before applying the second two ply lay-up.* (Another note: I utilized West Systems resin and hardener (105/206) during this process. I could go into significant discourse on epoxy systems, which I have fully researched, but I'll leave that for another article. Feel free to contact me or George Pereira for additional comments on epoxy systems as they are used on the GP-4.)

Once the epoxy/glass inside skirt has fully cured, you can then remove the canopy and set it aside. The inside skirt must be trimmed, as specified in drawing #47 to a height of 2 inches all the way around. Keep in mind that this 2 inches is measured vertically from the bottom of the skirt, i.e. lower edge of the mahogany. Because the skirt is angled as you move aft around, the surface area increases in order to maintain the two inch height.

Once the skirt base is trimmed, set it on the fuselage canopy base (apron) and check the fit (canopy-to-fuselage). At this juncture, you are ready to install the skirt on the four canopy rails (two forward and two aft) which facilitate sliding of the canopy. This process must be done with a fair amount of accuracy if you want the canopy to slide smoothly. (A binding canopy is simply no fun.) Assuming you have the necessary hardware for the rails on hand, install then per drawing #46. (Note: There exists a modified, Darry Capps design canopy rail system currently in use on the prototype and a few other GP-4's. This system provides approximately ½ to ¾ inch more shoulder room and utilizes smooth rolling cylindrical bearings for the aft canopy slides. Feel free to contact me for further details.)

Care must be taken to ensure all four rails are parallel and the mounting brackets for the rails (fore and aft) are in alignment with each rail. It is OK to have a slight misalignment if you have a little play in the bearings. As you progress through the process of mounting the canopy rails, you'll see that the canopy cross member is a required part to complete the rail system. Fabricate the canopy cross member per drawing #46 (top, center of drawing). It is important to note that you cannot use a single piece of spruce or other wood for the cross member – remember the 400 pound of lift force at cruise. Use a table saw to make the 11 degree cuts on the top and bottom of the cross member. You can also radius a piece of spruce, clear pine or Douglas Fir to put a nice top cap on the cross member.

With the inside skirt installed on the fuselage canopy base

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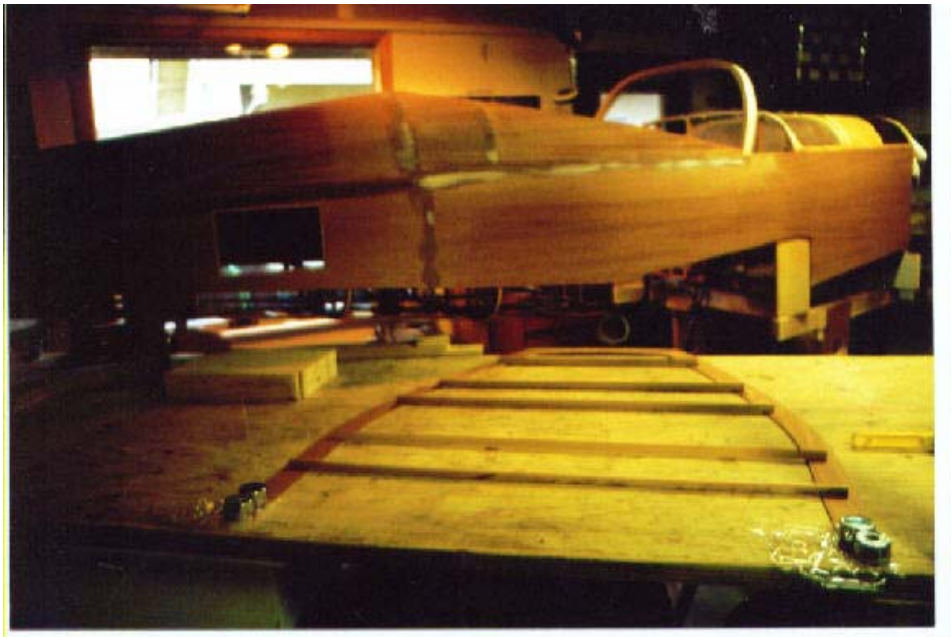
THE CANOPY INSTALLATION

BY MIKE TRAUD, GOLD RIVER, CA

(apron), install the canopy cross member using upper fuselage STA 63 as guide. This is a good time to check alignment of the aft slide rails before the cross member is glued into the canopy skirt. (Of course, by now, you'll wish you could just trash the whole project and get a Cessna.) When you think you have it all sliding smoothly, glue (epoxy) in the canopy cross member. (I used T-88 with a little cotton flox for additional strength.) When the glue cures and the inside skirt base structure is sliding smoothly, you are ready to move on to the next phase.



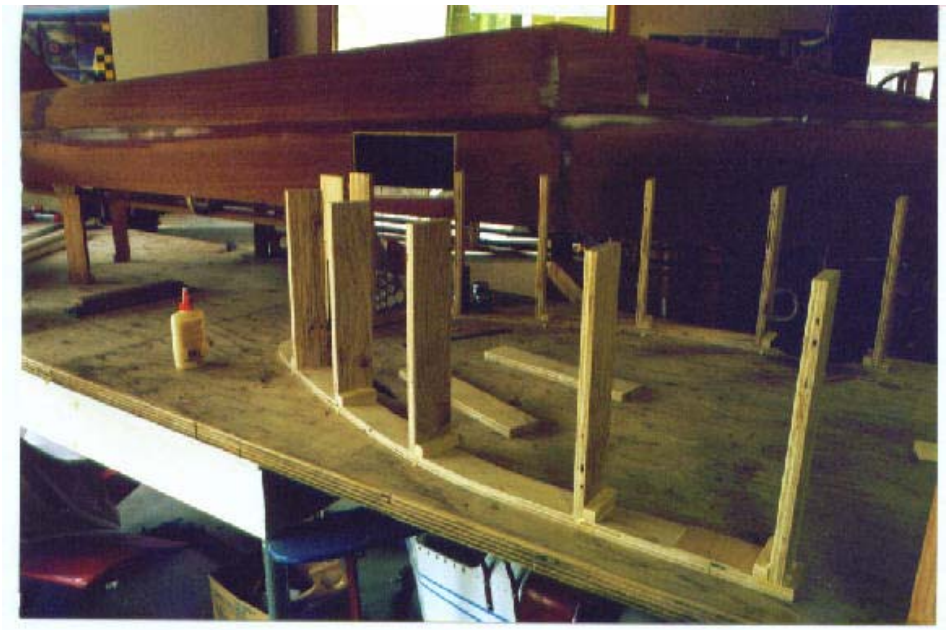
Canopy Skirt Base on Table—1/8" mahogany ply

In the next issue, we will discuss canopy and windshield bows, final trimming and fitting of the canopy plexiglass to the inside skirt base, fairing in the fuselage with foam and glass to make a smooth transition from canopy to fuselage, fabricating the outside skirt and maybe a few other things. Please feel free to contact me if you get hung up on this or any other part of your project. Piece of cake.

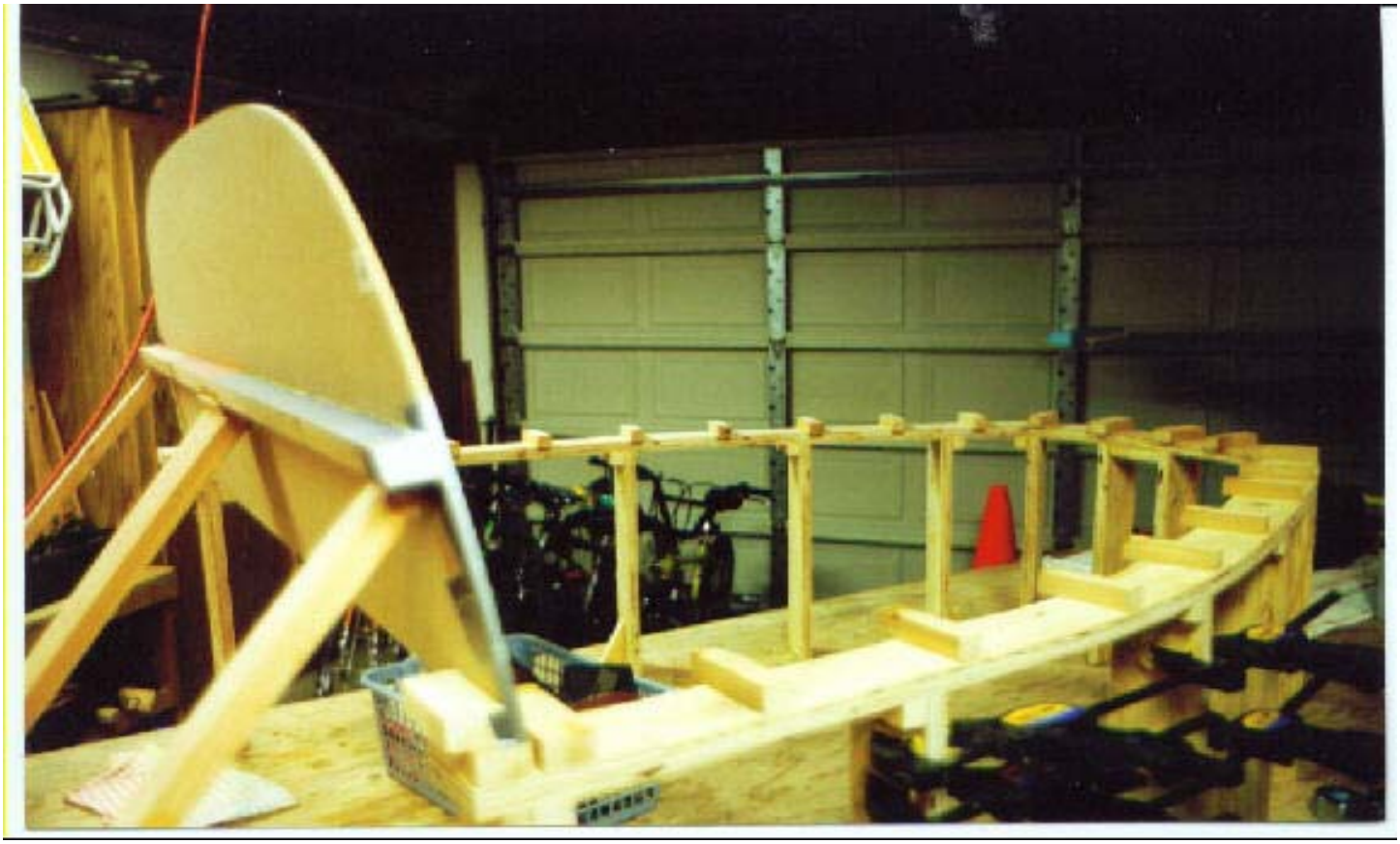
Mike Traud

Gold River Facility

taud@hotmail.com



Fabrication of Jig to construct canopy—note uprights

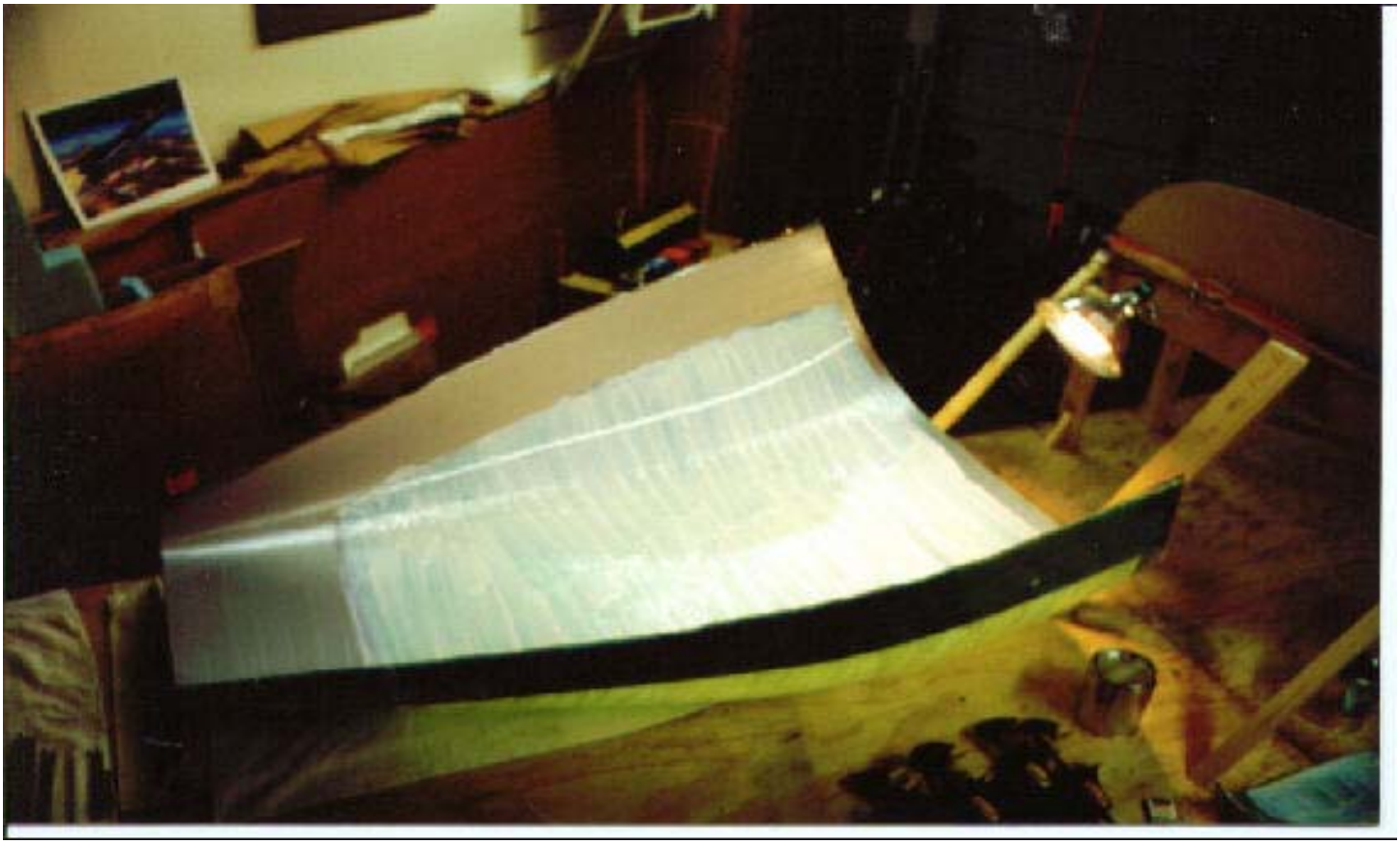


Final Jig Preparation including front former to maintain canopy fit—prior to inside skirt lay-up

Setting up canopy skirtbase on jig in preparation for inside skirt lay-up

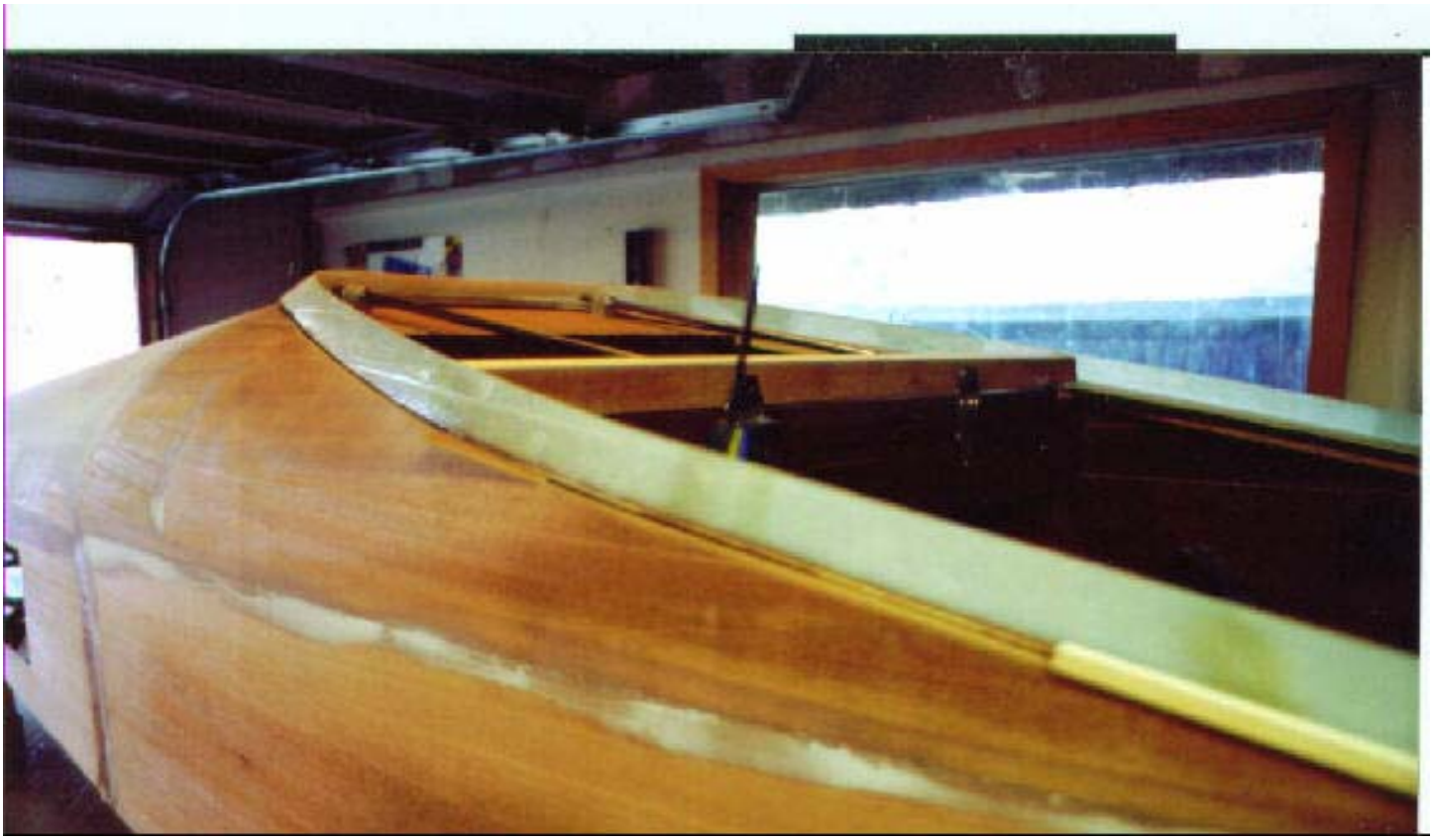
Checking fit and alignment of canopy skirt base on fuselage canopy base (apron)

Checking fit and alignment of canopy skirt base on fuselage canopy base (apron)



Protecting canopy plexiglass with Spray-Let after initial trimming

Untrimmed inside canopy skirt



Trimmed inside canopy skirt on fuselage canopy base (apron) as part of process to align canopy cross member

Initial fitting and alignment of rear canopy rails (rods) on fuselage canopy base

Installation of canopy cross member on jig after alignment process and fabrication of cross member

BUILDER'S UPDATE

VHF COM ANTENNA : VERTICAL STABILIZER INSTALLATION

BY ADRIAN MCCLELLAND, AUSTRALIA

I have decided that since the GP4 is a plans built aeroplane, there is enough to do without making stuff you can purchase "off the shelf". Here is my tail VHF antenna installation. I purchased an Advanced Aircraft Electronics antenna (P/N VHF-5I) from Aircraft Spruce and Specialty. My original intention was to install this up the leading edge of the fin as per the plans. This was not as easy as I thought due to the width of the antenna strip and the radius of bend allowed for the antenna. However, it was quite simple to install a ¼" X 1" strip inside the fin and glue the antenna to it. If I were to do it again I would probably order the VHF-5T and just glue to the inside skin. It has the connector coming off at right angles. However I had to make do with what I'd ordered, due to this being on the other side of the planet thing.

Bob Ringer has a similar installation, but uses a different antenna. Just as a side note. Bob was in OZ a few weeks ago and called in for a visit with Wayne Tomkins. Ian Humphryson was staying with me for the weekend so we had four GP4 builders together…..not very common in this part of the world. You will get a report on this at a later date.

(Adrian screen prints a small range of GP4 apparel—T-shirts, polos, sweats, etc…..Watch for more news soon !) - Elton

PART INDEX

BY DAVID FORBUSH

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PLAN INCONSISTENCY

On Drawing 9 the STA 78 Idler Arm Clevis is shown with a 3/8" inside width. The aft bearing, HF4C, is 3/8" wide and appropriately fits. However, the forward bearing, F45-19M, is .59" wide and is too large for the clevis. (thanks to Jerome Peck)

** Beginning next issue, we'll maintain a running list for the benefit of all builders **

LAUGHTER, THE BEST MEDICINE

I just love humor, and laughing, and enjoying life, don't you? Just remember not to mix flying and drinking.

-Elton

** 24 hours in a day, 24 beers in a case. Coincidence? I think not.

** Sometimes when I reflect on all the beer I drink, I feel ashamed. Then I look into the glass and think about the workers in the brewery and all of their hopes and dreams. If I didn't drink this beer, they might be out of work and their dreams would be shattered. I think, "It is better to drink this beer and let their dreams come true than be selfish and worry about my liver."

-- Babe Ruth

** An intelligent man is sometimes forced to be drunk to spend time with his fools.
-- Ernest Hemingway

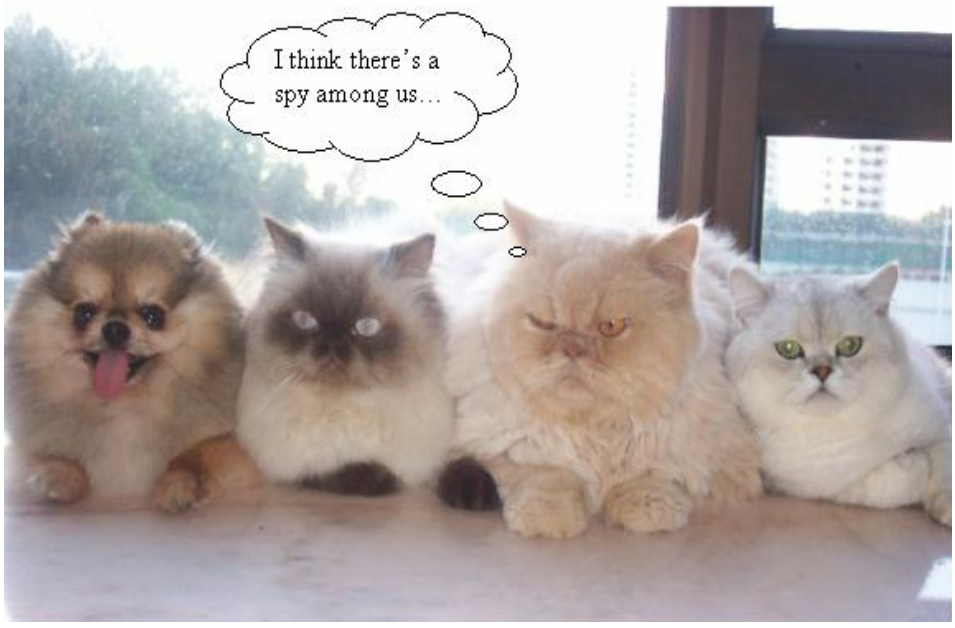
** When we drink, we get drunk. When we get drunk, we fall asleep. When we fall asleep, we commit no sin. When we commit no sin, we go to heaven. So, let's all get drunk and go to heaven!
-- George Bernard Shaw

Beer is proof that God loves us and wants us to be happy.
-- Benjamin Franklin

** One night at Cheers, Cliff Clavin explained the "Buffalo Theory" to his buddy, Norm:

"Well ya see, Norm, it's like this: A herd of buffalo can only move as fast as the slowest buffalo. And, when the herd is hunted, it is the slowest and weakest ones at the back that are killed first. This natural selection is good for the herd as a whole, because the general speed and health of the whole group keeps improving by the regular killing of the weakest members. In much the same way, the human brain can only operate as fast as the slowest brain cells. Excessive intake of alcohol, as we know, kills brain cells. But naturally, it attacks the slowest and weakest brain cells first. In this way, regular consumption of beer eliminates the weaker brain cells, making the brain a faster and more efficient machine.

That's why you always feel smarter after a few beers."



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Thank You!!

CLASSIFIEDS

For Sale:

Pre-fabricated composite components for the GP-4. Cowling, Exhaust Blisters, Inlet Ramps, and Tailcones. *Individual parts or complete package available*.

Cowls are constructed with West System Pro Set 125 Resin and 225 Hardener. They are hand lay-ups of 4 layers of 6 ounce cloth, and 2 layers of 10 ounce cloth.

I get great discounts on shipping and I pay for the packaging. For current pricing, please call or e-mail: Bob Ringer—Halifax, Canada.

Phone: 902-876-2871.

Cell: 902-483-4611.

E-mail: bobringer@eastlink.ca.

For Sale:

Quality custom fabricated metal components for the GP-4. State of the art equipment used by a certified welder to construct parts on the jigs obtained from Darry Capps. Available from: Raymond Beazley, Dartmouth, Canada.

Phone: 902-465-6141

Cell: 902-497-4187

E-mail: ray1beazley@accesswave.ca

NOTES—

* You do not have to order the entire package at once. You can order piece by piece, by sub assembly or by complete package.

* All parts are tagged for identification. Dimensions are as per GP4 plans so you must notify me of any deviation from the plans that would effect the size of a particular part.

* The pieces are cleaned by glass beading and then primed with an epoxy primer.

* You can order any part at your convenience. *Note:* I have all the necessary metal (from Wicks) however items such as the dynafocal engine mount ring, landing gear springs and hydraulic rams can be supplied by the builder or I can supply them at an additional cost.

* Small items can be supplied within a week with larger items and complete packages requiring up to six weeks.

Thanks !

Raymond

For Sale:

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We have all the back issues available in either electronic (.pdf) or hardcopy.

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Thanks……Elton