

# GP-4 BUILDERS & FLYERS NEWSLETTER

August 2005  
GP4BFN 48

## News for Builders of Fast Wooden Aircraft !



Jim & Betty Simmons in front of their Award Winning GP-4. N619BS was destroyed while landing at Oshkosh 2005. Both Jim and Betty are safe, but the aircraft was totaled. Jim reports the accident was through no fault of the aircraft design. I would like to thank Jim for the many articles he has written and the valuable knowledge he has passed along..... Best wishes from all of us.

# GEORGE'S CORNER

BY GEORGE PEREIRA



## Fellow GP-4 Builders:

I recently received some questions regarding flight testing the GP-4. I am far from an expert in flight test and have made my share of mistakes. I have flight tested 5 experimentals so perhaps I can share some information that may help with your first GP-4 flights.

## Experience and Current Flying Skills:

If you have never flown a high performance, responsive plane like a Lancair, Glasair or Pitts, some stick time in any of these types would help with getting a feel for your GP-4. Some of us stop flying when we are building, so often we are not current. You have to get your flying skills up before you test.

## Field Selection:

I would never try a GP-4 first flight on any field less than 3500 feet. Longer is better. Uncontrolled is also better. Distrac-

tions from a tower operator does not help on a first flight. Be selective with your audience. Try to have people that can make a contribution to your first flight. Know where medical help is in case of an accident.. it is nice to have fire protection available as well. Your best flying time is early morning. Don't work all day in assembly and fly when you are tired. Come back in the morning when you are fresh.

## Lift Off:

Some first flights are made with short lift offs and touch downs after some fast taxi runs. You need at least 5000 feet to do this in the GP-4. I did this in my first GP-4 test since it was the prototype and no model had ever flown yet. I recommend you make some fast taxi runs under 50 mph to check your nose gear steering, engine temperatures, etc. Taxi back in and shut down. Remove at least the top cowl and check the compartment. Your next run should be lift off. The GP-4 handles just

fine with gear up or down. It flies a little better gear up. If you have hydraulic gear, I would retract it as soon as you have a good, solid climb established. If you have the manual gear, leave it down until you level off and come back on power. If everything is in the green, you can fly around close to the field for a time and retract after you are comfortable with slowing up to 100 mph. You also have the option of leaving the gear down on your first flight, however; you will notice a nicer handling GP-4 once the gear is retracted. I recommend you make first flights as light as possible I only used my center tank for first flight. No fuel in the wings. In the pattern, 15 inches will give you about 110 mph gear down. I would use full flaps after turning final. You will notice a slight pitch down as the flaps come down,; which you can trim out on your landing approach. You will carry a little power down the approach to keep airspeed about 100 mph

Your GP-4 is a very stable, honest little airplane. It goes wherever you aim it and it just gets there a little quicker than some airplanes you have flown. Try to relax, make smooth control inputs and have fun. Your first flight will be one of your thrills of a lifetime.

Regards,

George

(see V speeds next page)

## V SPEEDS

## GP-4

V <sub>so</sub>	54 KIAS	The stalling speed or minimum steady flight speed in the landing configuration.
V <sub>s</sub>	64 KIAS	The stalling speed or minimum steady flight speed at which the airplane is controllable.
V <sub>ref</sub>	83 KIAS	The speed at which the airplane is flown, in a stabilized condition after the final approach fix is passed while conducting an instrument approach procedure, or during a visual approach (3 degree descent path), to the point where speed is reduced for flair and touchdown.
V <sub>f</sub>	100 KIAS	The design flap speed.
V <sub>fe</sub>	100 KIAS	The maximum flap extended speed.
V <sub>le</sub>	100 KIAS	The maximum landing gear extended speed. * (see note)
V <sub>lo</sub>	100 KIAS	The maximum landing gear operating speed
V <sub>a</sub>	180 KIAS	The design maneuvering speed.
V <sub>df</sub>	223 KIAS	The demonstrated design diving speed.
V <sub>ne</sub>	223 KIAS	The never-exceed speed.

\* Note: The manual operated landing gear can start extension at 130 KIAS. After the speed drops to 100 KIAS, the gear can be fully extended into a locked down position.

The hydraulic landing gear has a maximum extended speed of 125 KIAS.

## BUILDER'S UPDATE

# THE CANOPY INSTALLATION

BY MIKE TRAUD, GOLD RIVER, CA

The Canopy Installation, Part 2

[traud@hotmail.com](mailto:traud@hotmail.com)

We left the first installment of this series with the canopy cross member having just been glued to the inside skirt (canopy base). It is important to note here if you are installing the Darry Capps roller bearing canopy slide modification, you must drill the  $\frac{3}{4}$ " diameter holes for the roller bearings, set at an 11 degree angle corresponding with the angle of the fuselage canopy base, before you install the cross member. (see photo #1)

At this juncture, it is a good idea to install the canopy slide mechanism on the fuselage and get the canopy base sliding on the rails. Your installation (i.e. plans version or Darry Capps modification) will dictate which hardware required to install. The installation is straight forward, simply follow the plans.

It is important, however, to insure the rails, fore side rails and aft apron rails, are parallel to each other, other wise the damn thing will bind up when it slides. If your particular installation is not quite parallel, you can mitigate this issue by insuring a little play exists in the installation. This can be done by adjusting the rails slightly with a bridge, or shim (any thickness to achieve

smooth sliding). Remember, the canopy itself consists of plexi-glass, fiberglass and mahogany ply – three different materials which vary (i.e. they flex) differently with changes in temperature and humidity. So, if it binds up, no sweat, just relieve the rails with an appropriate bridge or shim. (Just so you know, Darry Capps drove to my house from Gustine, CA to check out my canopy progress. At the time, the canopy was binding up slightly (and not sliding smoothly). Darry simply recommended a 30 thousandths strip of 6061-T6 under each forward side rail to relieve the tension on the side bearings. This solved the problem so well that the canopy now slides forward easily and needs to be held open. More about a canopy friction lock device in the next article.)

Now that the canopy is sliding smoothly and you are satisfied with how the whole thing works at this point, you can install the canopy bow on the inside skirt (canopy base). Referencing drawing #41, upper left side, you see the windshield bow is set at 71 degrees relative to the top fuselage longerons and 15  $\frac{7}{8}$ " from the top surface of the top longeron to the top surface of the canopy bow.

In order to ensure the proper canopy bow angle; first set the

windshield bow on the fuselage as per drawing #41. This step is critical because if the correct angle is not achieved, the canopy glass may not meet the windshield glass at the correct angle, which could result in a drag penalty during flight (not to mention unsightly lines – more on this below).

When setting the windshield bow, remember to consider the differences in thickness of the canopy glass and windshield glass (if appropriate, reference the first article for this discussion) and the gap between the canopy base (apron) and inside canopy skirt – these factors determine the correct height of the windshield bow. What this means here is the possibility of trimming the bows to achieve the desired match when the canopy is closed on the fuselage. Are we having fun yet?

After the bows are trimmed (if necessary) and everything checks out per drawing #41, you can glue in the canopy bow and associated spruce support blocks. You may want to consider radiusing the inside edge of the canopy bow prior to installation in the inside canopy skirt – much easier to radius prior. The radius on the inside edge finishes the bow nicely and removes the sharpness of the edge on fingers when closing.

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So.....we now have a complete canopy frame (i.e. inside skirt/canopy base and bow) to accommodate the canopy glass. Very cool.

Place the inside skirt on the fuselage with all the attendant sliding hardware in place and functioning. This now allows you to start the canopy glass trimming and drilling process. If you purchased your canopy from *Airplane Plastics*, some pre-trimming will have to be done first before the canopy glass is of such a size to fit on the fuselage. Take great care and time to trim the glass as it may crack and then you will be down right pissed off at the whole affair.

To trim the glass, I utilized a Dremel Tool with a carbon cutting disc and went very slowly. Very slowly. This worked well and resulted in a nice smooth cut through the glass. When you get the glass trimmed enough to fit over the canopy inside skirt/canopy base, the final fitting process can begin (which is followed by drilling the glass to the inside skirt).

Fitting is accomplished by utilizing the forward edge of the canopy glass as reference, making the juncture between the canopy glass and the windshield a straight line. (If it is not straight

at the canopy/windshield juncture, there will be difficulty in making the canopy strap and windshield strap (both fabricated from .050 6061-T6) meet properly, smoothly and flat as indicated in the drawings. Use a straight edge or template to simulate the windshield angle (slope) to get a good idea of how the two will meet when the canopy is closed. (For builders encountering this particular problem, talk with John Reinhart about a solution. John utilized a procedure to make this transition if the canopy does not meet the windshield in the flat line.)

Once you are satisfied with the position of the canopy glass on the fuselage, mark it for final trimming. Trim the glass to its final shape, checking the fit as you progress through this process. Look at the edge distances along the canopy sill, look at the transitions of the glass on the aft portions of the fuselage (see below) – really look the thing over before you are completely satisfied – then trim and drill. Over checking is not a bad idea here and can result in a lot less four letter expletives.

As mentioned in the first installment of this series, most builders are acquiring their canopies from *Airplane Plastics*. These canopies are first class with uniform thickness throughout and

superior optics. (These guys build canopies for military applications – they know the business.) The canopy from *Airplane Plastics* is not a stretched T-18 canopy as was utilized in the prototype. Because of this difference in manufacturing, slight differences exist from the prototype in shape and contour of the glass. As a result, you may find your canopy fits on your fuselage with a slightly different aft curve transition to the aft fuselage surface just behind the canopy. This is mitigated during the process of fairing in the canopy to fuselage and is by no means a problem. If you position the glass as stated above using the forward surface as a reference to the windshield, you may find the aft surface does not follow through as flat as indicated in the drawings. Fairing in the aft outside skirt will take care of this with no drag penalty.

The process of trimming and drilling the canopy glass is completely detailed in drawing #47, lower left side of the page. George spells out the entire process and procedure to get the canopy properly drilled and mounted on the inside canopy skirt as well as fabricating the outside canopy skirt. It is important to note that you must use a plexiglass drill bit to drill through the plexiglass or you'll risk cracks. A good idea here is to

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have on hand various sizes of plexiglass drill bits up to the largest hole to be drilled which is 3/8" diameter. Use the smaller drill bit to pilot drill the holes in the glass and through the inside canopy skirt. Once pilot drilling is complete, any final trimming can now occur followed by final drilling. The steps detailed in drawing #47 spell it out such that it would be redundant to repeat them here.

The next discussion on canopy fabrication will focus on the outside canopy skirt and fairing/blending in the canopy to yield a very nice transition to the fuselage. Also discussed will be some accessories for your canopy such as an aft vent, canopy friction lock and canopy mirrors. Please don't hesitate to contact me with any questions or concerns regarding the canopy or any other aspect of building (and flying) a GP-4.

Mike



Canopy cross member with 3/4" hole for roller bearing—set at 11° angle



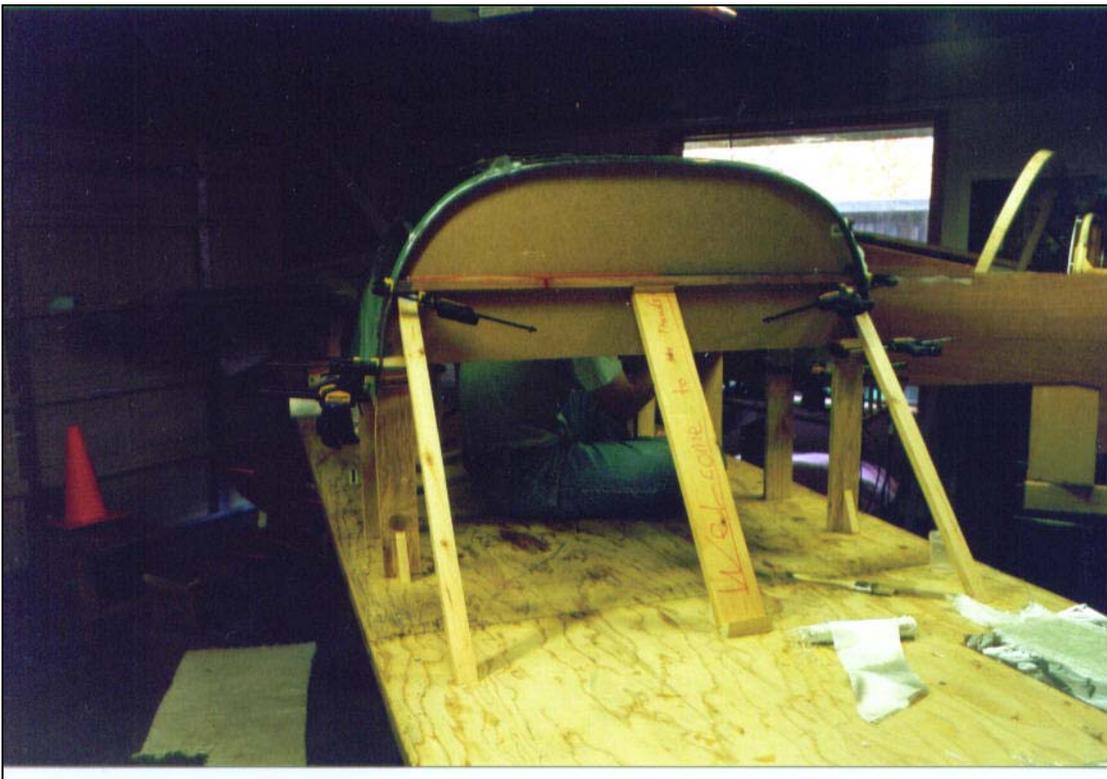
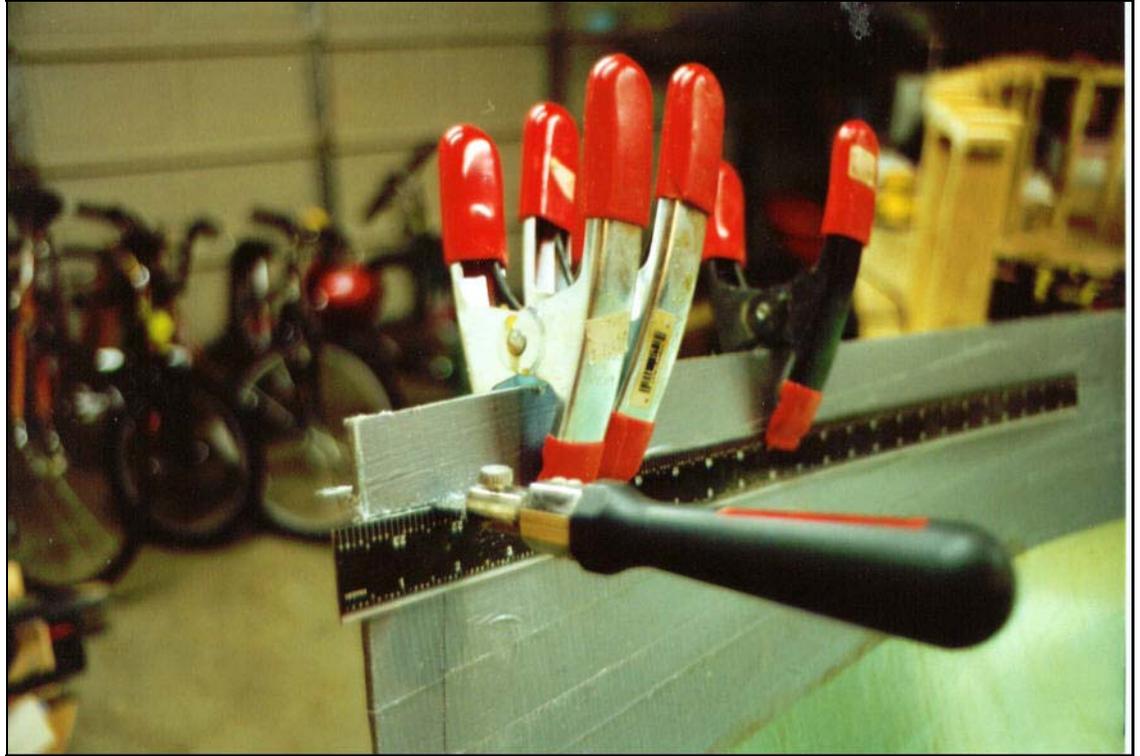
Canopy glass inverted for the initial "rough" trimming

# BUILDER'S UPDATE

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BY MIKE TRAUD, GOLD RIVER, CA

Initial trimming of the canopy glass using a special plastic sawblade



Canopy glass on inside skirt on jig during trimming process. Note windshield bow on fuselage.

# BUILDER'S UPDATE THE CANOPY INSTALLATION BY MIKE TRAUD, GOLD RIVER, CA



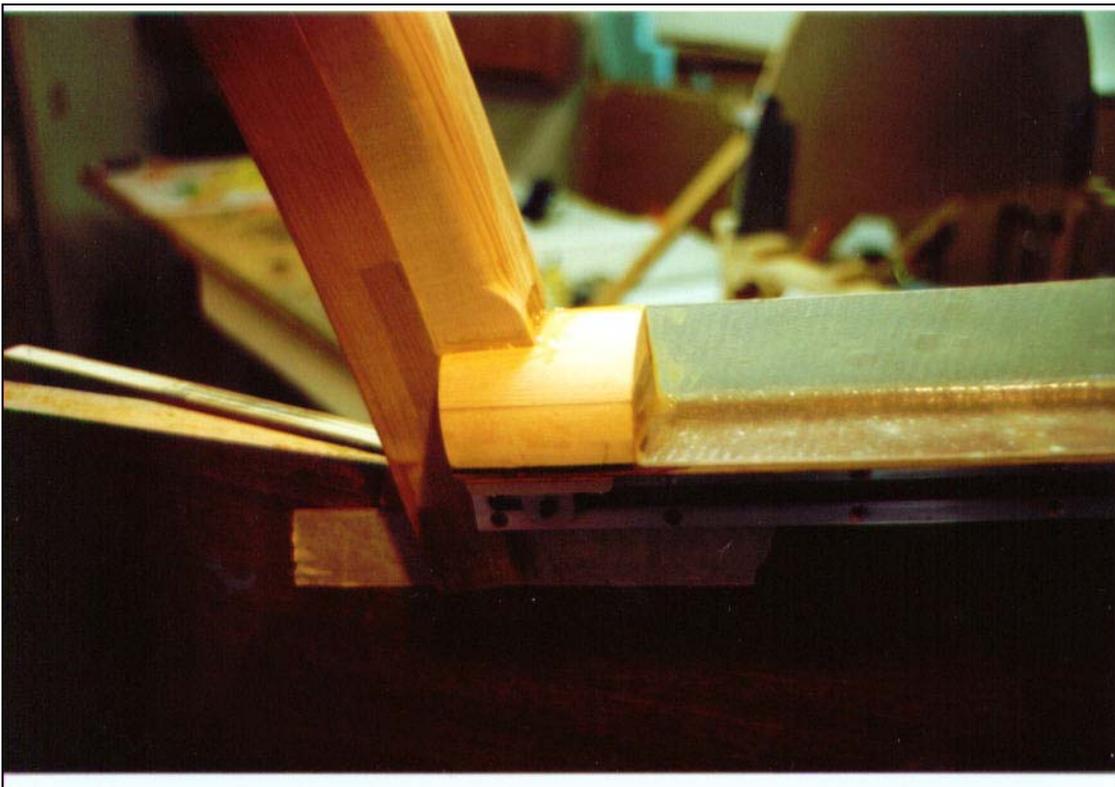
Canopy bow under construction



Canopy and windshield bows being trimmed to match

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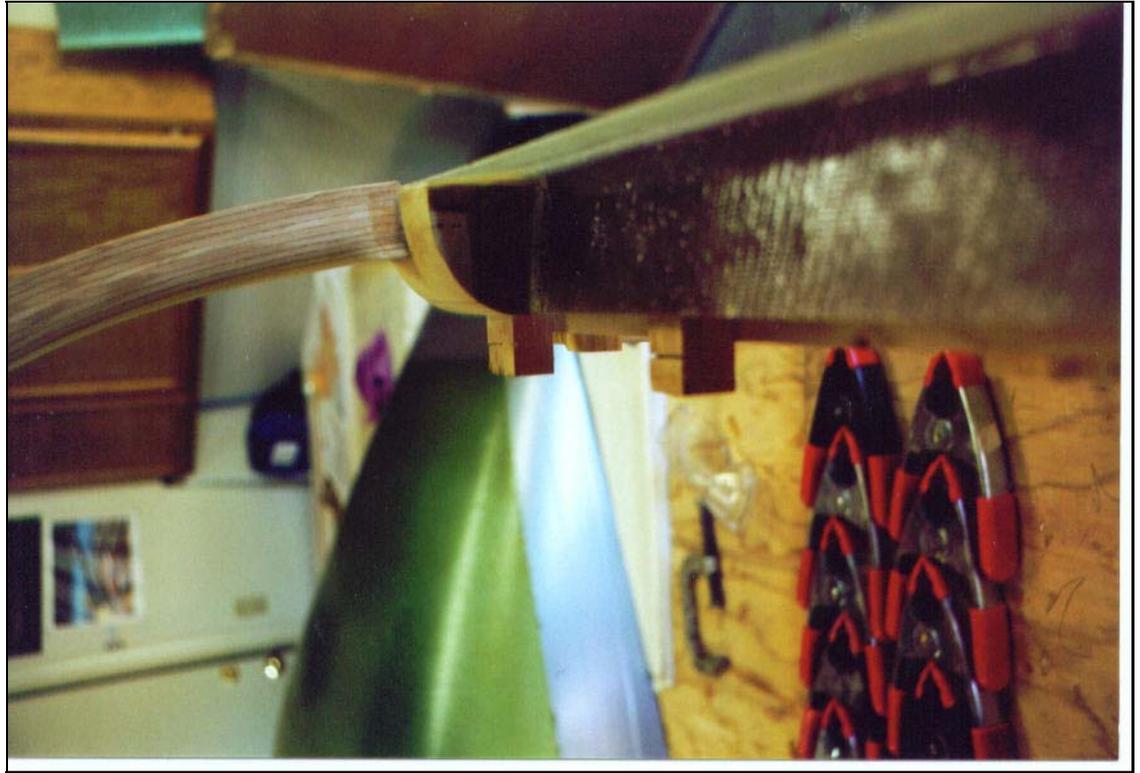
Canopy bow during fitting process. Note windshield bow and spacers under skirt to properly "set" canopy structure on fuselage



Canopy bow detail showing spruce mounting block. Note radiused edge of bow.

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**THE CANOPY INSTALLATION**  
 BY MIKE TRAUD, GOLD RIVER, CA

Canopy bow detail  
 showing trimmed  
 inside skirt



PLAN INCONSISTENCIES

\* 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.

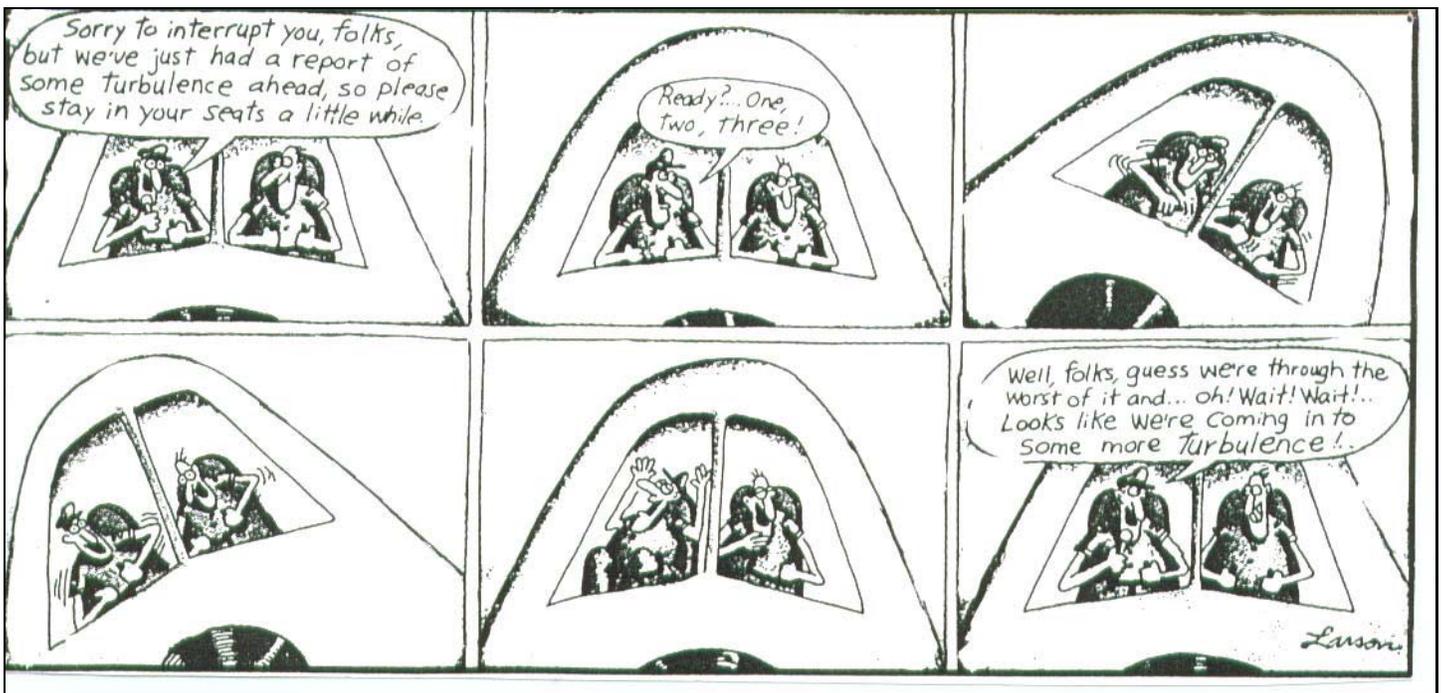
\*\* If you know of something that should be listed here for all our builders, please e-mail me, thx! \*\*





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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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Complete set of 1 - 40 = \$40.00

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Individual Issues 41— 47 = \$3.00 ea

CDs containing electronic files of the same are available

Complete CD of 1—40 = \$10.00

Complete CD of 1—47 = \$30.00

All are plus shipping.

Please contact me at ecultice@woh.rr.com for a complete price and payment options. I currently accept checks, money orders, and paypal payments from around the world.

Thanks.....Elton