BUILDERS & FLYERS
GP4
NEWSLETTER

THE OFFICIAL VOICE OF GP-4 BUILDERS ALL OVER THE WORLD

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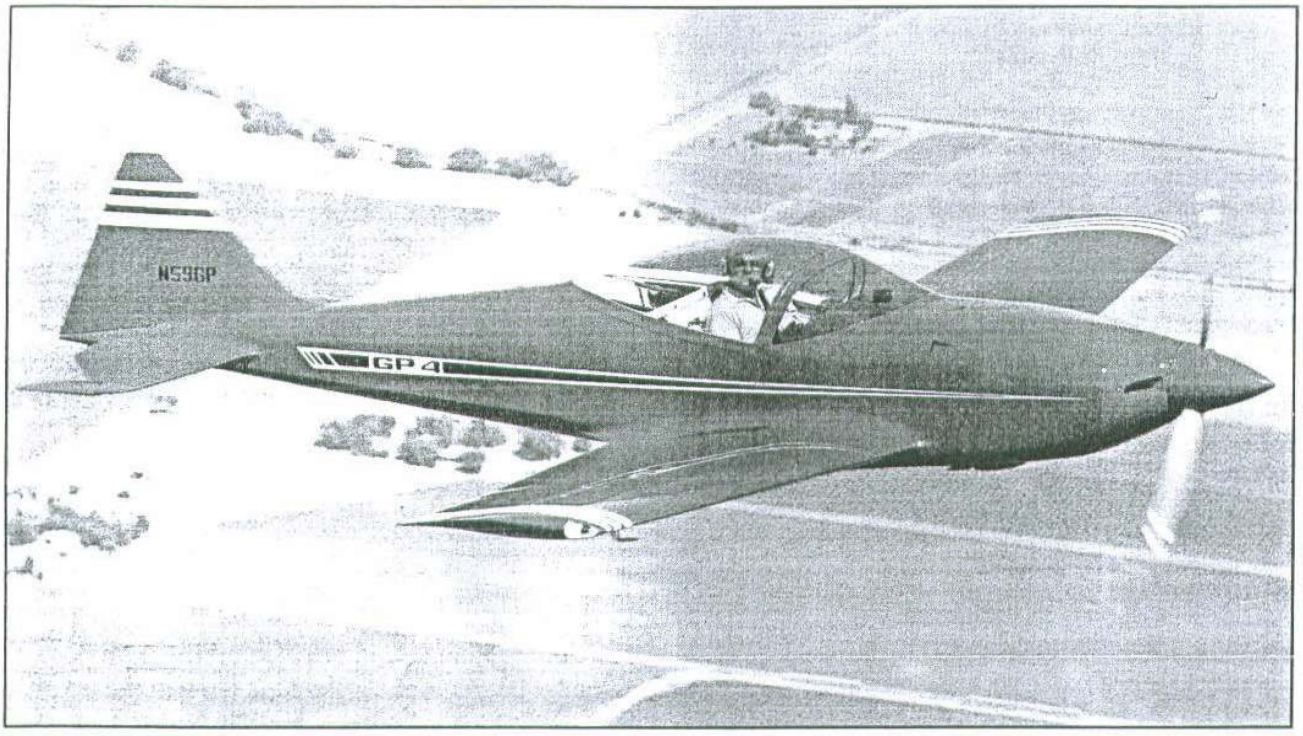


George Pereira out on a stroll through the California farmland!

Building the GP-4

Part one: The Prelininaries

by John Evans

Having been conned into allowing my name to go forward for the Executive Committee and having been duly elected, it seems the next task is to write something for the magazine! What have you got me into, Mick?

After giving the matter some thought I propose to do a series on my GP-4 project as it develops, so here follows the first episode.

What is a GP-4 and why did I choose to build it, I hear you say? To answer that I will have to give you a little background information.

I am a 66-year-old retired Mt Cook Airlines pilot. I took early retirement in late 1987 to complete the building of a 16 metre yacht, on board which my wife and I lived and cruised for five years. I then spent several years involved in the marine charter business before being lured back into aviation with the offer of a job

flying one of Mt Cook's old HS.748s
John Evans at work for the last time, in Royal Tongan Airlines' HS.748 A3-MCA mid-1999

with Royal Tongan Airlines. I had already re-validated my license and bought a one-share in a Nanchang CJ-6 based at Omaka. Initially signing on with Royal Tongan for a year, the job has lasted for nearly three years and has been a most interesting and enjoyable experience. However, that is another story

In mid 1998 I was flying our normal Saturday run back to Tonga from Samoa when one of our cabin girls called on the intercom to ask if she could bring a passenger to visit the flight deck. I as usual agreed to this and at the conclusion of his visit the passenger handed me a copy of the January 1998 Kitplanes magazine. Little did he realize what he was starting by this simple gesture!

On extracting the magazine from my flight bag after the flight I found therein a long article on George Pereira and his Wooden Wonders which included profiles of several of his GP-4 builders. After rereading the article several times I began to think it was the answer to my prayer.

I had long decided that I needed another project to keep me occupied during the next few years of retirement, preferably something I could do in the basement of our Picton house. On checking the measurements it appeared the GP-4 wing would just fit with room to work and with any luck it could be got out without having to demolish the house! Another attraction was the fact that the speed and range of the GP-4 is very similar to my HS.748. It cruises at around 200 kts and has a range of approx. 1100 nm and, last but not least, it is made largely of wood, a material with which I am familiar and enjoy working with.

I next sent away for the information package which served to raise my enthusiasm another notch to the point where I had to see and fly the machine. In October 1998, while still based in Tonga, I managed to get away for a few days and made a quick trip to visit the designer George Pereira in Sacramento, California.

The GP-4 is the latest in a series of designs by George who I now well into his 70s. His first, dating back to the 1970s, was his Osprey 1, a single-seater wooden flying boat with folding wings which was sold to the US Navy as a reconnaissance aircraft for the Mekong Delta. The next design was the two-seat amphibian Osprey 2 with really little in common with the Osprey 1 other than the family resemblance. In all some 1478 sets of plans have been sold and George estimates that 500 to 600 have flown since 1975.

We don't know anything about the GP-3, but the GP-4 was designed in 1981 and flown at Oshkosh in 1984 where it was judged Grand Champion and outstanding new design. My plan number is 396 and to my knowledge 12 or so are flying in the USA, with several more nearing completion.

I met George on a beautiful autumn morning at his little strip at Rio Linda on the outskirts of Sacramento. After examining the prototype and talking for a while George said, "We better go flying so you can see for yourself how it handles."

Once at a safe altitude George let me try a few steep turns and a couple of stalls. I found it very sensitive on the controls after flying heavier aircraft but felt I would soon become friends with it. George looked at the clock and declared it to be lunch time so we landed at another little strip which backed onto a golf club where we enjoyed a leisurely lunch before returning to Rio Linda. Later that day I left George to start the long trek south again now with a set of plans under my arm.

A few weeks later I ordered part of the material kit from Wicks Aircraft supply This took several months to deliver due to problems with supply of the wide spruce boards, but it was waiting for me when I arrived home from Tonga in October last year. I am now at time of writing some 500 hours into the project.

It may appear to the reader that I leaped into the project with very little forethought or planning, so I shall attempt to dispel this idea forthwith.

I was not concerned about my ability to carry out the project at a practical level as I have been involved with aviation most of my life, and in fact the first five years of my working life were spent as an engineering apprentice with the old NAC at Christchurch Airport. Also the knowledge gained in the building of several boats has given me the necessary self-confidence to undertake the task.

One of the first things I did was contact the CAA to get to grips with the current rules and requirements for the home-builder. They advised me to join the Sport Aircraft Association, through which I have made numerous helpful contacts and gained much useful information.

I next purchased the Wicks & Aircraft Spruce catalogues, plus books such as the FAA published Aircraft Inspection & Repair, several of the Tony Bingelis series and a couple of books on aircraft welding. I also subscribed to the GP-4 bimonthly newsletter and read anything else on the subject I could find.

During the last eight months of the Tongan contract I was job sharing with another Mt Cook retiree working one month and coming home for a month. This allowed me to get the basement work area up to a satisfactory standard for the task ahead, which turned out to be quite a job in itself. It was necessary to line out the main basement area with gib board, put in new lights and electrical outlets and cut a concrete foundation to allow access a further area I planned to use as an engineering department. This area required a new concrete floor and the construction of wall separating it from the carport. It was also necessary to erect a prefabricated garden shed to get such objectionable items as the garden tools and lawnmower out of sight!

Finally I built the work benches, numerous drawers and cupboards and of course the long work table on which the aircraft is built. This table is built using three sheets of 19 mm plywood, and of course has to be as level as it is possible to get it.

While all this was going on I was scanning the newspapers and searching the second-hand shops for the necessary tools and machinery, all the while kicking myself for getting rid of most the gear I once had for the boat building projects and thought I would never need again.

Items I have acquired, some second-hand and some new, include the following: bandsaw, small circular saw, Skilsaw jig saw, belt sander and orbital sander, sanding disc (homemade), drill press and hand-held drill, Myford lathe, bench grinder, gas welding plant, electric TIG welder, along with a good supply of clamps and numerous hand tools. I am also at present building steel welding table, a small bending brake and a sandblasting cabinet. While some might argue that it is not necessary to have so much equipment, it sure saves time and a lot of chasing around getting other people to do work you are capable of coin if only you had the tools.

I thought along the same lines when I decided to get the material kit from Wicks Aircraft Supply. This kit, although not complete, has all the spruce timber in the correct lengths, all various sizes of steel tube and sheet, all the plywood and most the fastenings and fittings. It was expensive, but when you weigh this up against all the running around and hassles one would encounter trying to source all these materials locally, I thought it well worth while.

So much for the preliminaries. In the next installment we will start construction.

To be continued in a future issue

Some additional comments from John Evans

Dear George and GP-4 group,

I thought the group might like to read the article that I prepared for "Sport Flying" as it features my offering on the GP-4 on page 8.

I am getting along pretty well at approx. 650 hours into the project. As it is winter here I am concentrating on the metal components and have all the solid Aluminum pieces done and a lot of the steel cut ready for welding. I am taking TM lessons and rapidly gaining confidence to the point where I will have a try on the 4130 very soon. I think I told you that my wing is all set up with fuel tanks in place so I am now working on the landing gear truss and other center wing components.

Hugh Tapper, who now has his Kit is working with me on the purchasing of components etc. He has just taken delivery of two sets of cowls from Jake Jackson while I have bought two hydraulic pumps and have two sets of cylinders and emergency valves on the way from Don Austin.

The Link Socket Bearings were a bit of a challenge and turned into quite an expensive exercise. In the end I managed to get a piece of 4" diameter round bar in 6351-T6 and had a local machine shop turn up two pairs. Have you or anybody given any thought to getting castings done for these. How did Darry Capps do them?

If you are looking for something for the Newsletter a photo or drawing of Darrys landing gear Jig would be appreciated.

As I get more into the project I more and more amazed at the detail and accuracy of your plans. I have come across the odd small mistake or omission but nothing to cause real concern as yet. It is great to hear of more & more GP-4's getting close to flying.

Kind regards,
John Evans
6 Suffolk St.
P.O. Box 71
Picton, New Zealand
E-mail: evans-GP4@xtra.co.nz

Builders Tips

To follow was pulled from the GP-4 internet discussion group, good info - Spud

Hello everyone,

I have a question about the formers, trying to find out if I made a mistake. I just put the fuselage sides in the jig and am getting ready to put in the cross members and formers, the stations have moved forward like it said they would in the plans. The problem is with the former templates page #3, the width of the templates correspond to the station widths on page #2 not the width once the sides are in the jig. Example station 97 width is 33 3/8" in the plans but when the station moves forward (about 3/4")it becomes 33 11/16" a difference of 5/16". Is this correct and page #3 templates are incorrect or should the cross member and former be moved aft. I am planning on just making the formers wider but would like to know if anyone else ran into this problem.

Thanks, Mike Haugen #290
Oklahoma City, OK

Continued on page 4

Hey Mike,everyone;

You are correct, the formers don't "exactly" line up. My understanding (and the way I did it) was to fit them directly over the forward portion of the station as they fall on the sides. Hmmmm, in other words, forget about the measurements and use the verticals on the sides for your station numbers. This works out because the formers have to line up with the cross members under them. And they need to go on the forward side because the cross members are 3/4" and the formers are 1/2".

Now, they still may not fit and you may have to either sand them a little to fit, OR, you may even have to add a little pine or spruce to make them slightly bigger (as I had to do at STA 168ish).

Glen Brandt

Hi,
This is my first computer, so I can help with some question on the GP4 now that I can answer. But first I would like to know it anyone has a IO-360 case that I could use to make my engine mount I promise to get it right back to you. I have drop 3/4 of an inch of the nose gear because the ones I have seen sit to high. And I am putting a quasar prop which will give me plenty of prop clearance.

Where I am right now, everything from the windshield back is skinned an ready for glass? The main gear is in an hyd. ran an hook up including dump valve the cabin area is pretty much done, an nose gear is made an ready to install that's another reason I need a case. As far as the formers I made them according to he first pages showing the dimension an everything came out OK.

Lynn Sheets #360
Bloomington, IL

Hi Mike,

Make sure you have a former for each fuselage must form a straight line. If you don't had add extra formers, you will get a small 'curve' not equal on both sides of the centerline. (before I add those extra formers, I had 1.5 inch on one side and 3/4 inch on the other). I don't remember any other problems in that area.

Also, one should be careful with templates, I made my former to match my fuselage sides, so you can't only rely on the templates, they have to be use as a guide. You will get this same problems with some stabilizer ribs. I had to 'verify' if they matched the width of the stab spar, and then have to 'modify' accordingly. Before cutting or doing any pieces, check if everything fits.

PatriceTheriault - Builder #104
Terrebonne, Quebec, Canada

Fellow GP-4 builders,

As you know, sheet 31 of the GP-4 plans shows the Cessna worm gear assembly for our flaps. My A & P for my Cessna was looking at my work the other day and mentioned that there was an AD on the mechanism. The "fix" was to add a 1 " diameter by 7.5" hydraulic tube to the assembly. It works to prevent total and instant flap retract in case the steel balls in the tube fail, causing the flaps to retract uncontrollably.

der without benefit of a part number. After describing where it is in a Cessna, how big it is, and what it does, one of the Wentworth guys said, "Oh, you mean the screen door closer." It appears that the one part was used on all the 100-series Cessnas.

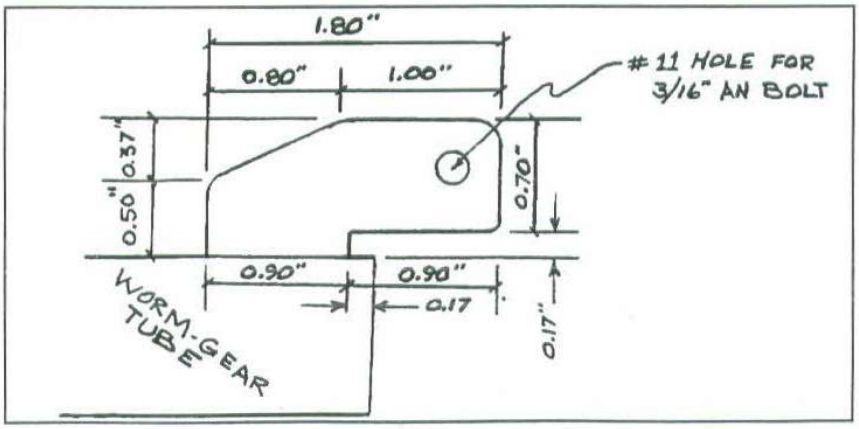
To attach it to the worm gear tube I fabricated a bracket and welded it to the tube. Perhaps others might use the idea or maybe they will think it is just being overly cautious. My concern was having a failure with flaps extended on final, at or below Vs.

I mounted the bracket on the top of the worm gear tube, rotated about 15 degrees from vertical. That way I could attach the plunger rod above the worm gear and away from wires and lines under the mechanism. This also allows me to use a longer bolt on the back of the co-pilot's left seat rail and a simple right-angle bracket on the rear spar to attach the fixed end of the cylinder. The enclosed drawing is to scale with all the dimensions. I used 4130 by 0.1000 steel for strength because the force applied in case of a failure could cause the bracket to bend.

I have also made a couple other modifications. When time permits I will send copies in case you might want them for the newsletter. Thank you Spud for all you do for usand to all those other builders that have contributed to the newsletter. I hope everyone had a nice holiday.

Sincerely,

Jim Rusch
2141 Co. Rd. C
New Richmond, WI 54017



GEORGE'S CORNER

Fellow GP-4 builders:

I was helping Jake Jackson balance his elevators after he had some minor repair on one side, and had just repainted both sides. It seems a good time to review this very important part of your airplane construction.

We mass balance all of the control surfaces on the GP-4 in order to prevent control flutter. Flutter, the rapid attenuation of a control surface, can destroy wing and tail structures so fast it is unbelievable. It is always more catastrophic in high performance aircraft because the flutter frequency builds with speed.

I will always remember the aileron flutter I experienced in the Osprey 1 while testing it for the Navy. The Navy required a dive test to 140 MPH. At 130, the aileron started a low frequency flutter which induced the right wing to flutter. In seconds, the wing looked two feet thick. Fortunately, the wing held together and I was able to get down and remove a fixed aileron tab I had installed. The tab was thin aluminum which induced the aileron to flutter and spread into the wing structure. The deterrents to prevent flutter for us homebuilders are well known. Keep all flying surfaces torsionally stiff and yet light as possible. Mass balance on the hinge line. (I subscribe to a slight over balance, see adjoining sketches.) Keep hinges and the entire control system free of excessive play. Balance the ailerons, elevators and rudder AFTER finish painting. If you repaint, re-balance.

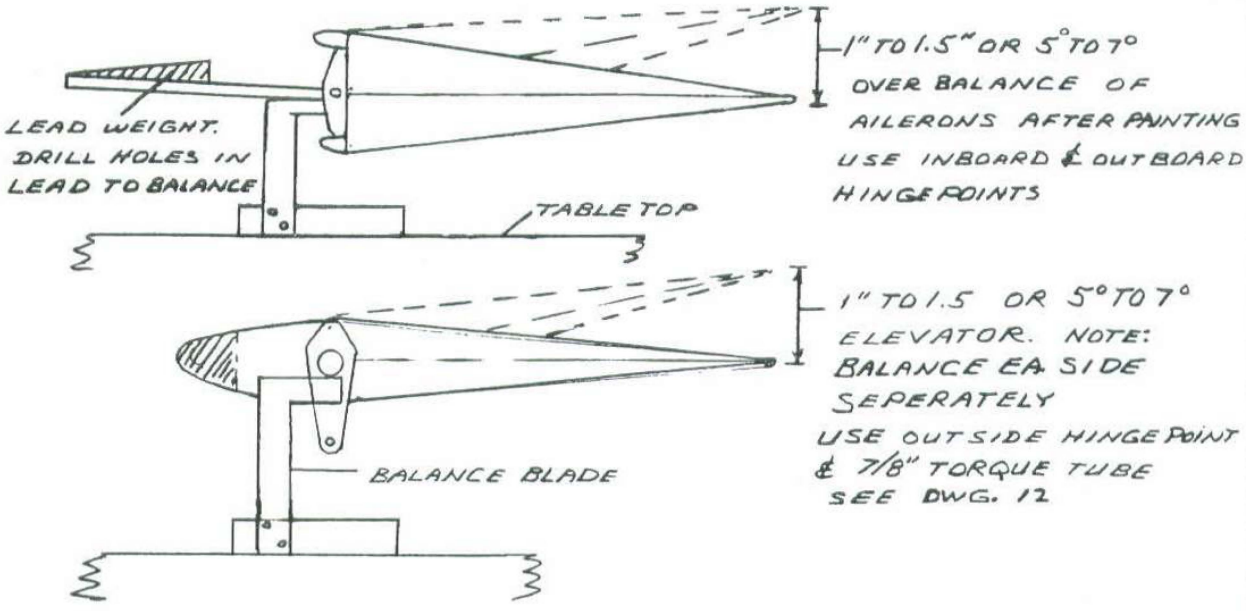
I flight flutter tested the GP-4 prototype after it was painted and rubbed out. To test for flutter, you try to induce a flutter condition by banging the stick left and right as well as fore and aft, stabilizing between each bang. The rudder is kicked left and right. I did this through various speeds coming out of a descent into a climb. If it flutters, you hope you can slow up before a structural failure. I would start each faze at 9,000 ft. Speeds started at 180 MPH indicated and increased by 10 MPH and increases up through 250 MPH. Needless to say, my apprehension grew with each speed increase!

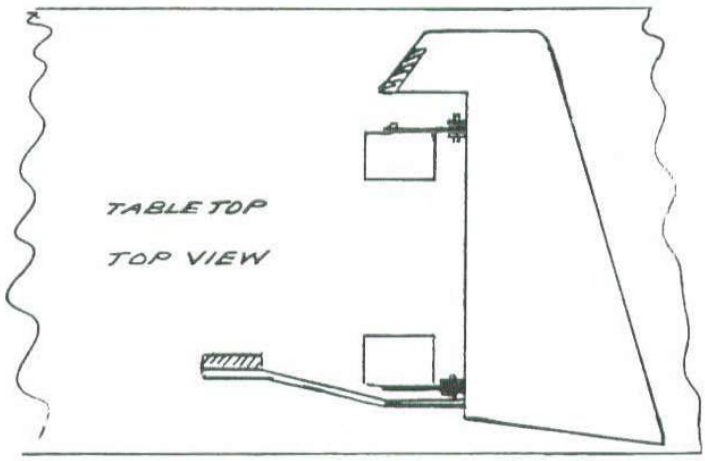
I feel so strongly about flutter prevention, that I used these tests to establish the GP-4's VNE 250 MPH IA/s. The prototype has been through 300+ MPH, but it was not intentional, and that's another story!

There are safer ways to test for flutter statically in a hanger, but it's very expensive. I elected the flight test, which is a more positive test. If you builders follow the plans and balance as shown, I see no reason for any of you to flutter test. I think we have a very solid, high performance air frame.

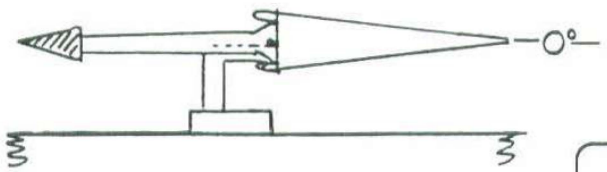
Regards to all,

George





BALANCE RUDDER FLAT ON TABLE TOP SHOULD BALANCE NUTRAL. AFTER PAINTING



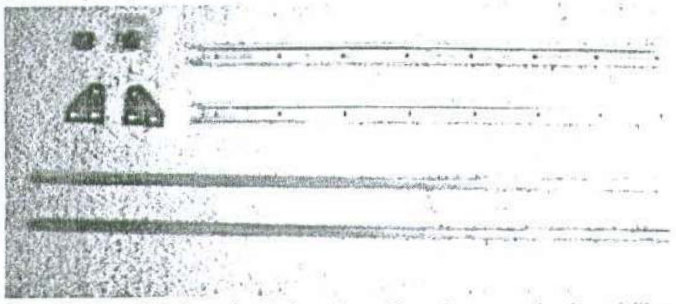
GP-4

OSPERY AIRCRAFT

CONTROL BALANCE
NEWS LETTER ITEM
NO SCALE

The Classifieds

For Sale: **Stainless Steel canopy hardware kit.** The components include: Stainless steel canopy side rails, stainless steel canopy slide rods, 4130 steel brackets for side rail bearing mounts, and the bearings. Call for pricing. Mike Traud,11907 Prospect Hill Drive, Gold River, CA 95670 (916)635-1147



For Sale: GP-4 project: fuselage framing, vertical stabilizer framing, horizontal stab and elevators framing complete. Firewall installed. All fuselage internal hardware complete (D. Capps). All wood packages, two fastener kits. Project signed off by EAA Tech Advisor with compliments on construction quality. Fuselage signed off for closure. Stu Fitrell, sfitrell@lxpk.veridian.com or (301) 373-8087 or 25723 Vista Road, Hollywood, MD 20636. (27/28)

For Sale: New Hydraulic Gear Plans Upgrade. Convert your GP-4 manual landing gear system to hydraulic - electric system. Complete with emergency back up system. (Note: System must be installed prior to wing skinning!, no retro-fits) Complete print package for $150.00 Mail your checks to: George Pereira 3741 El Ricon Way, Sacramento, California 95864 phone (916) 483-3004 Fax (916)978-9813 E-mail GP-4@juno.com

For Sale: Pre-fabricated composite components for GP-4. Cowling , exhaust blisters, inlet ramps, tailcone . Complete four-piece package. Call or E-mail for current pricing. Shipment will be sent "Freight Collect" - Jake Jackson - Rio Linda, CA (916) 992-0608 E-mail J7200@aol.com

Back Issues: We have all of the GP-4 back issues (#1 thru #23) available for $3.00 each. Mail your checks to Bill Spornitz - 1112 East Layton Drive - Olathe, KS 6061-2936

Wanted: Looking for a GP-4 project that is "well under way" through "close to being finished". Will consider all projects. Contact me at (503) 646-5276 or by mail at Edward Mitchell, 13835 S.W. Devonshire, Beaverton, OR 97005

Wanted: An original video (not a copy!) that George Pereira made on the GP-4. I have a multi-copied video now, but is very poor. Will gladly pay a reasonable price. Contact: Spud Spornitz (913) 764-5118 or 1112 East Layton Drive, Olathe, Kansas 66061

Subscribers Information Center

GP-4 Builders & Flyers Newsletter (GP4BFN) is currently published Bimonthly at a rate of $3.33 per issue/$20.00 a year in U.S. $3.50 per issue/$21.00 a yr. in Canada, Alaska & Mexico. $5.00 per issue/$30.00 a yr. (U.S. funds) per 6 issues to foreign subscribers. Send remittance to: GP4BFN, 1112 Layton Drive, Olathe, Kansas 66061. **PLEASE MAKE CHECKS PAYABLE TO: BILL SPORNITZ**

913-764-5118

E-MAIL BSPORNITZ@AOL.COM

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Phone (916) 483-3004
Fax (916) 978-9813
E-mail ***GP-4@juno.com***

THE GOOD NEWS ABOUT BEING RETIRED IS HAVING MORE TIME TO BUILD MY AIRPLANE.

Outside of card

THE BAD NEWS ABOUT BEING RETIRED IS ... . . .

GIVING UP THE CONTROL OF THE TV REMOTE TO BETTY – THE BREADWINNER!

Inside of card

Seasons Greetings,
Jim Simmons #366

MERRY CHRISTMAS
AND
A HEALTHY AND HAPPY NEW YEAR!

BUILDERS & FLYERS
GP4
NEWSLETTER

1112 EAST LAYTON DRIVE
OLATHE, KANSAS 66061

First Class Mail

NEWS FOR CRAFTSMEN OF FAST WOODEN AIRCRAFT!