

# Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 14

Published by the Pulsar Builders' Association

January, 1992

## MISCELLANEOUS:

Happy 1992 to everyone! Mark Brown is already busy making plans to visit various places this year with the Pulsar/Pulsar XP. Mark's first stop may be San Diego in Rick Meyer's Pulsar XP at Brown Field on Saturday, January 18, 1992. EAA Chapter 14 will be holding their meeting there and Mark hopes to demonstrate the Pulsar. Anyone watching TV knows that Texas has been underwater for a month. Mark is busily working on a floatplane version of the Pulsar so he can take off from his field! The 1/18/92 schedule is very tentative due to the ongoing bad weather. You can contact Mark for trip updates.

On a separate note, Rick Meyer has asked me to act as distributor for a new 1992 experimental aviation calender. Each month features a full color photo of a homebuilt aircraft. What makes this calender special is the 9" x 11" color picture of the Pulsar XP flying high overhead in the Texas sky. The photograph is new and is extremely nice. The calenders are \$6.75 + 1.00 postage (foreign orders require \$4.00 for air mail). We can accept orders only until 2/15/92 since we must send all excess copies back to the publisher.

## BUILDER INPUT:

Bob Gere (Toledo, OH): "If anyone building a Pulsar is ready to drill and ream the main spar, I have a 19/32" bit with 1/2" shank and a 5/8" reamer which I will gladly lend when needed. This may help some builders save a few bucks and time tracking down these items." Phone: 419-537-8705. (Thanks Bob--your generosity is sincerely appreciated. Ed.)

Thomas Gibbons (Oakdale, MN): "I have found that hard to find 1,1,1 Trichloroethane described in a previous *Pulsar News*. It's called "CARBOCHLOR" and it's made by Sunnyside. I found it at my local lumber store, Menards. Have everyone look for a white and yellow one quart container. Total hours so far on my project are 360. Progress is slower than I want, but I've decided not to push too hard so I can take my time for a good result! The only modification I've made is to move the flap torque tube forward 2" to allow the seat bottom to be lowered for more headroom (I'm 6' 1.5" tall)."

Bob Taylor (Mystic, CT): "I've recently talked to some composite users regarding proper fiberglassing techniques. They have suggested that all pieces to be bonded should be the same temperature--and they should all be warm (i.e. 70°F or warmer). In addition, as we enter the colder months, make sure that all epoxies are 70° or more for mixing. Otherwise, the epoxy may not mix as thoroughly as is necessary"

Harry Jones (Vineyard Haven, MA): "In case any builders have trouble finding the carb. jet charts here they are--reworked from the California Power Systems catalog. I have simplified the main jet chart to eliminate the need to solve an equation. PLEASE note that the chart applies only

the the 582, temperatures are in Fahrenheit, and only shows the jet sizes available. No one seems to know whether the temperatures are at MSL or at the altitude you select in the table.

I have started using Amsoil at 100-1. At last, my plugs stay clean! After I've accumulated about 40 hours on the oil and inspected the pistons, rings, etc. I'll report on the results. Since you use only half as much oil, it's cheaper than AV-2. Also, you have to fill your oil tank only half as often. It's supposed (?) to decrease fuel consumption too. If any other builders are using Amsoil, can they call or write me to discuss their results." (Box 149, 11 Crocker Ave. Vineyard Haven, MA 02568 phone: 508-693-1776).

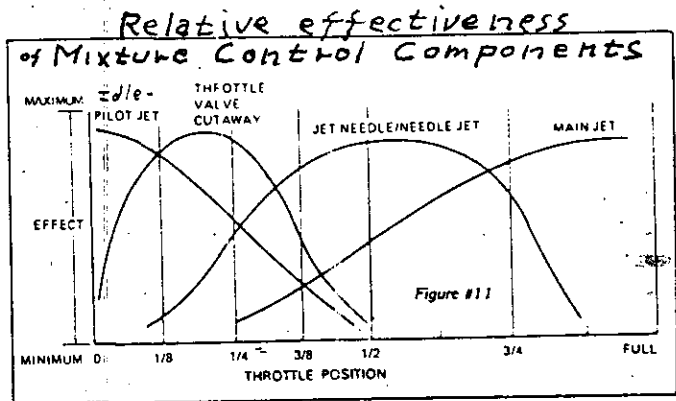
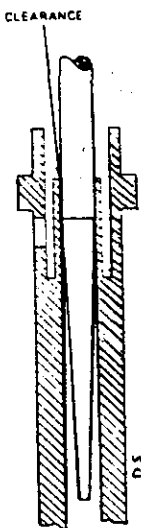


Figure #9—The jet needle and needle jet form a fuel passage by creating a variable clearance.



*582 Jet Needles have  
4 Notches*

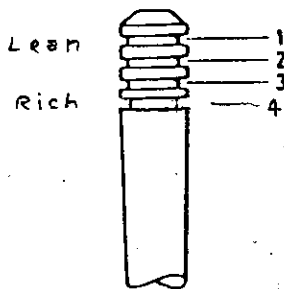


Figure #10—Changing the holding plate position will change your mid-range fuel mixture.

The Jet Needle: This part is available in 6H2, 802, 8G2, 8L2, 15K2. may be a lot more available, but it's a well-kept secret, at least in this rule of thumb to apply is, needles with a "High Number Code" produce above half-throttle. Example: 8L2 instead of 6L2. Needles with a "H" produce richer mixtures below half-throttle. Example: 6P2 instead of 6L2.

**MAIN JET CORRECTION CHART-- 582**

Alt. →	0.0	500'	3000'	4500'	6000'	7500'	9000'	10500'	
Temp.		Main jet sizes							
-22° F	170	170	165	165	162	160	158	150	
-4	170	170	165	162	160	158	158	150	
14	170	165	162	162	158	158	158	150	
32	165	165	162	160	158	150	150	150	
50	165	162	160	158	158	150	150	150	
59	165	162	160	158	158	150	150	148	
68	165	162	160	155	158	150	150	148	
86	162	162	158	155	150	150	148	148	
104	162	160	158	155	150	150	148	148	
123	160	158	158	155	150	148	148	145	

**CALIFORNIA POW**

## FIBERGLASSING TIPS FROM PHIL DURIEUX:

I recently talked to Phil at the Aero Designs factory about a fiberglassing problem I was having. We also talked about the various fiberglassing methods used by the builders. The lack of "step-by-step" fiberglassing instructions can cause many questions for the first-time homebuilder (and headaches!) Mark Brown has asked if I would write a brief article based on Phil's comments and suggested techniques. We'll focus on two areas: bulkheads and landing gear.

### A. Bulkhead joints:

Some builders have had trouble working with the glass tape using the method described in the construction manual. Here is an alternative method that works very well but takes a little more time to complete the lay-up.

1. When installing glass tape on a bulkhead, use a 1" or 2" paint brush and paint a layer of resin on the bulkhead surface before applying the glass tape. You can then put the fillet of micro in place and glass over the fillet. The layer of epoxy will insure a good bond between the glass tape and the bulkhead surfaces. It also helps when you are using very dry micro which sometimes doesn't stick onto the bulkhead surface.

2. Bulkhead joints can also be done in two steps to ease construction and minimize frustration. 1) Spread a micro fillet into the joint and allow the micro to cure. Use 100 grit sandpaper to smooth out the micro fillet in preparation for laying in the glass tape. (To save time, use peel-ply over the fillet to minimize sanding after it's cured). 2) Using your paint brush, apply a layer of epoxy over the micro and the bulkhead surface. You can then lay a dry piece of glass tape over the joint and wet it out with your paint brush. Some builders prefer to saturate the tape prior to installation and this is also acceptable. You will find that the brush works great for smoothing out air bubbles and it also keeps the epoxy off of your hands.

### B. Landing Gear:

Five layers of 4" glass tape are installed around the outside of each gear tab. The 90° bends around the gear bottom up onto the gear tabs makes it hard for the glass to lay down smoothly. Phil has suggested radiusing the lower gear tab edge to ease the bend. Make sure the glass tape stays in contact with the gear as it bends up the sides of the tabs. Some of the landing gears may have a slight concave bottom surface. Fill this with micro so the glass wrap will stay in contact with the gear. Trim the glass layers as you apply them with a pair of scissors about 1/4" around the edges of the tabs.

Fifteen layers of glass tape are required between the tabs on the top of the gear. Don't stack all 15 layers together and then try to install them on the gear. Phil suggests limiting the stacks to one or two layers at a time, working out the air bubbles between each stack. This way also avoids any "bundling" of glass layers in a multiple lay-up.

With all the glassing required for the gear tabs, why not do a bit at a time. You might want to divide the gear tab lay-ups into two or three sessions. You could lay the 15 layers inside the tabs in one session and wrap the 5 layers around the outside of the tabs in a separate session.

To test the integrity of your lay-up process in general, Phil recommends a peel test with one layer of glass tape bonded to a scrap piece of composite panel material. Your bond is adequate if it takes at least 5 lbs. to pull the tape off the panel. Also, some of the epoxy should remain on the panel leaving some raw glass exposed on the tape. However, Phil pointed out that peeling tape does not demonstrate the actual strength of the bond. The real strength is in shear!

Make sure the epoxy is fully cured before trying a peel test or the test will be meaningless. Epolite 2315 requires 16 hours at 77° for full cure or 30 hours at 65°. Below 65° the cure time is indefinite. The structural properties of the epoxy are not affected by slow cure times, but you must be sure to mix and store all epoxies at 70° or above.

Humidity does not significantly affect the cure time or structural properties of epoxy. However, high humidity levels can cause a tacky film to remain on the surface of the cured epoxy which must be removed prior to any subsequent bonding or painting.

### **FROM THE FACTORY:**

Two more Pulsar builders have just turned into Pulsar pilots! Our sincere congratulations go out to Alan Belt of Lexington, Kentucky and Chuck Stroh of Oklahoma City, Oklahoma. The reports that we have so far indicate that both of these new Pulsars are flying beautifully after some minor trim adjustments. The only difficulty reported by Chuck is that he's having a hard time keeping it slowed down to the early operating limits.

As a status report, we are settled in to our new facility and we really appreciate your patience as we get things organized. Production is back up and running smoothly and all kit shipments are on or ahead of schedule. We've now shipped 155 kits and at least 18 are flying.

I've had a couple of calls from builders who have been asked by their local EAA chapters to present a short program on the Pulsar. We do have some random slides of the Pulsar in flight and a few construction shots. Also, we have some spec sheets that would make good handouts. If you need any of this material, just call the shop and we'll fix you right up.

On a similar subject, we are finally making plans for a Pulsar video and we need your help. We want to include plenty of construction footage but we don't have anything under construction to film. Therefore, if any of you have a high quality Super VHS system and would be willing to film some of the major steps during construction we would really appreciate hearing from you. Also, if you have some good still pictures or slides taken during construction, we can transfer those to video.

On the subject of construction, we have discovered a missing step in the manuals. After the wings are complete, the exposed surface of the root ribs must be covered with one layer of 3 oz. fiberglass to protect the ribs from abrasion and chemical attack. It is important to protect the ribs from chemicals because solvents like gasoline will totally dissolve the foam rib material.

Well, that's all the news this time. All of us at Aero Designs want to wish you a very prosperous and safe new year and tell you how much we appreciate your support, how much we value your friendship and how much we enjoy working with you.

### **ROTAX SERVICE BULLETIN:**

Mark Brown has sent me a copy of the Rotax Service Bulletin relating to the Bing carburetors used in all Rotax UL engines. I have reproduced the Bulletin on the next page for your reading and inclusion in your Pulsar service/maintenance file.



## Safety - check of the BING carburetors used in all ROTAX UL engines

### 1) General information:

Premature wear on carburetor-parts e.g. jet needle, needle clip and float can cause engine troubles, engine stoppage or emergency landing.

It may be critical, where the jet needle rotates because of vibrations, caused by a loose fit of needle clip.

### 2) Immediate check:

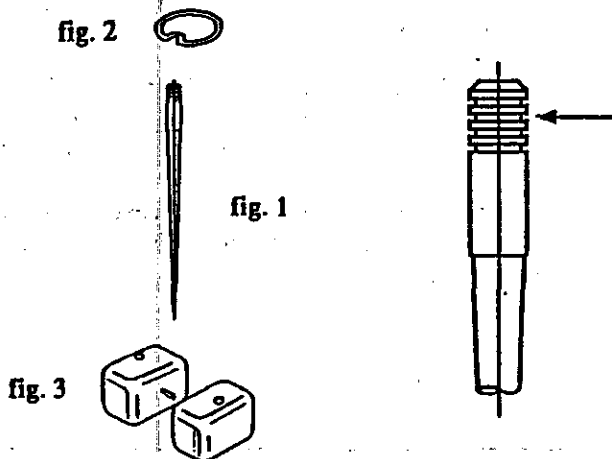
2.1) Check jet needle (fig.1) and needle clip (fig.2) for wear. If you can detect any wear in the ring groove of the jet needle (see arrow) replace both parts immediately.

2.2) Float (fig.3) Formerly the float had a aluminium-tube-guide which was flanged on both ends. If the material of the floats is broken at the guide tube or if guide is worn, replace both floats. Carb jets might be blocked by material from float.

The aluminium-tube-guide has been replaced by a not flanged brass-guide for better sliding ability. Check floats with brass-guide as well for any defect in material.

### 3) 50 - hours check:

Carry out check according to item 2 every 50 hours of operation. (See Maintenance plan SI 3 UL 91 - E)



## BOMBARDIER - ROTAX

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## NOTICE FROM KODIAK RESEARCH RE: ROTAX OPERATION

(This report comes from Aero Designs for reading by all Pulsar Builders.)

Oct. 18, 1991

Subject: Type 582 Intake Rubber Socket

Rotax Part Number 876 690 or 570 1370

"Reports indicate a potential problem of the intake socket 'splitting' in the clamp retaining recesses. The possibility exists that continued operation with a split intake may lead to the carburetor becoming detached from the engine.

While our records show only a one percent failure rate at this time, we feel extra caution should be used to inspect this component on each pre-flight. This should be done by deflecting the carburetor with hand pressure to visually inspect the area of concern for signs of splitting. Should any question about the airworthiness of the component be in doubt, the aircraft should not be flown. Contact your nearest Rotax Service Center for replacement parts.

Since this part is subject to deterioration from both age and environmental conditions, no warranty will apply to engines with failed sockets beyond the six month time frame."

### WRAP-UP:

That's about it for this issue. However, with 18 Pulsars now flying, it's time for me to ask some of you Pulsar pilots to send in some reports. Especially helpful would be information on your initial flights, what you encountered, what adjustments were necessary (if any) and how you're proceeding with your flight testing. The initial flights can certainly be anxiety generators so the more information a soon-to-be Pulsar pilot has the better.

I plan to include a new builder listing in Issue 15 or 16 (depending on space). The list will be formatted by builder location to aid everyone in locating other builders in close proximity. I hope this format will be useful. If anyone wishes to be omitted from the list, please let me know.

Kim and I also wish to thank everyone for their valuable input and help during this past year. As more Pulsars start flying, I look forward to the day when we can start to organize some Pulsar Fly-Ins. Until then, take care.

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January, 1992

# Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 15

Published by the Pulsar Builders' Association

March, 1992

## MISCELLANEOUS:

• **Builder's List** -- I promised in the last newsletter to include an updated builder's list in this issue. Since that time, I've received a substantial amount of builder input which I wanted to get to all the builders as soon as possible. As such, I've decided to postpone the builder list and I'll try to get it into the next issue.

• **Newsletter Subscriptions** -- To limit the number of subscription renewal reminders we mail, I've started to include subscription information on each mailing label. You will now see the newsletter issue in the upper right hand corner which corresponds to the expiration of your subscription. If you see a "17", then issue 17 (July, 1992) is the last paid issue. Kim and I are trying to lessen the "bookkeeping", so if you can send in your check when your subscription is close to expiring, it would be most appreciated. Also, if you feel we've made a mistake, drop me a line in the mail and I'll correct it.

• **Professional Kit Builders** -- I recently received piece of mail from a firm called Black Knight Aviation. Black Knight "specializes in kit aircraft construction and assembly". I called them to see if they would build a Pulsar. They haven't built a Pulsar yet and they were still gathering information from Aero Designs to put together a firm price quote. However, they did say that a Pulsar XP owner could expect a completed, painted, and certified aircraft 12.5 weeks from delivery of the kit. Estimated building time for the XP was 1,000 hours which includes 40 hours of certification flying and painting. Price for the finished product was estimated at US\$21,000 (plus the kit cost). Black Knight will not contract for partial completion or completion without certification. They said they only build kits from start to finish and perform all certifying to insure a quality aircraft. Given the very quick turn-around time, and the fact that they do all painting and certification, this might be of interest to a few Pulsar builders (present or future). You can contact Black Knight at:

Black Knight Aviation  
P.O. Box 19319  
Louisville, Kentucky 40259  
(502) 969-5282

The Company didn't have any information on the standard Pulsar so that's why they were using the Pulsar XP for quotes. HOWEVER, please note that the \$21,000 price tag wasn't firm as of 1/15/92 when I talked to them. Contact them for a firm quote and delivery time.

## **BUILDER INPUT:**

**Mark Burrow (Independence, MO):**

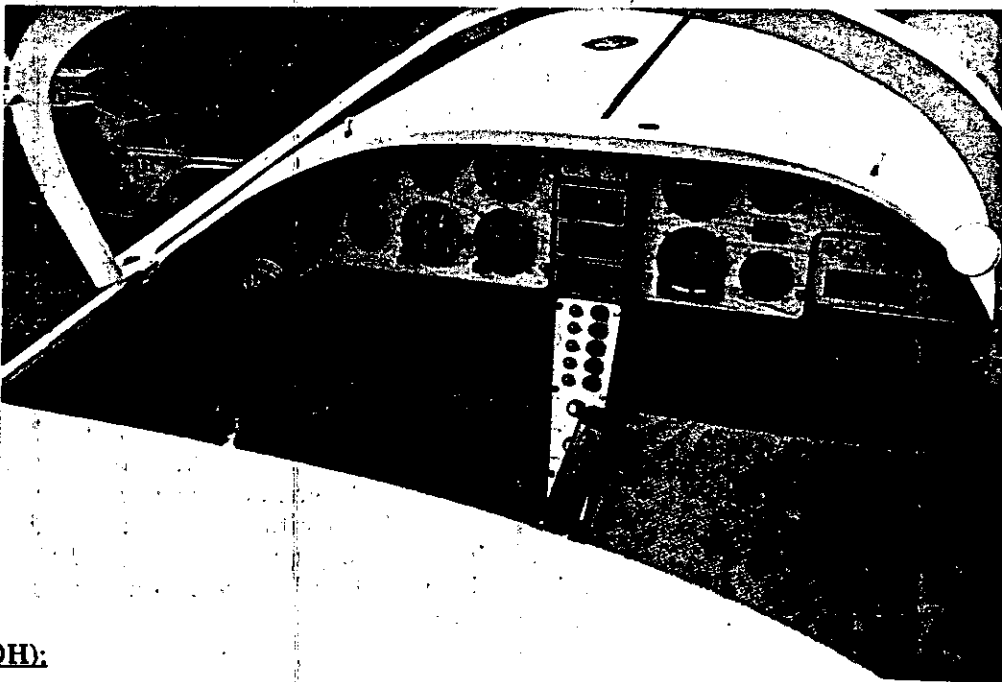
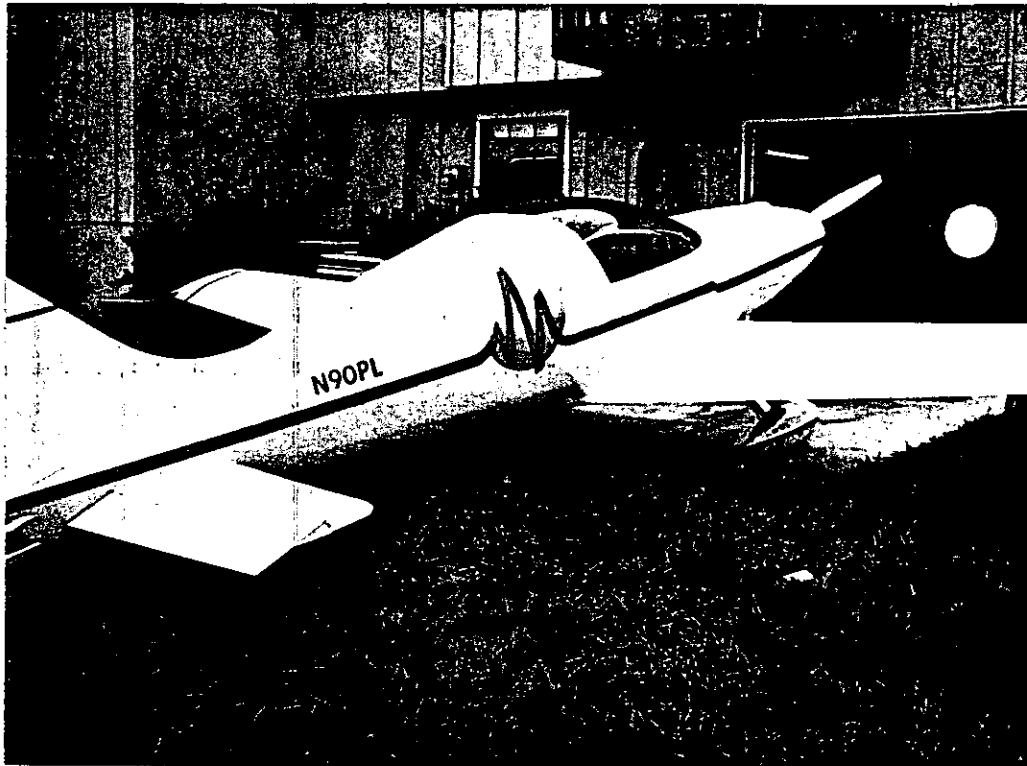
Today (2/6/92) I brought my Pulsar home from the upholstery shop. These pictures were taken before upholstery, last December.

My Pulsar is complete and awaiting certification. Building time was 1,300 hours. I experienced a delay when the tailwheel spring broke during taxi testing. Also, I installed the 582 balancer (vibration dampener) and engine noise suppression devises. The static on my Terra radios was terrible. It is now tolerable, but there is room for improvement. Does anyone have any ideas for reducing radio interference???

Also, if any of you builders could write an article on the certification (FAA) process, it would be very helpful to the builders. There seems to be a never-ending mountain of forms, requirements, etc.

**David Robertson (Cincinnati, OH):**

1. First the simple ideas. Cut the mixing stick ends square to better scrape the bottom of the cups.
2. Place a piece of Saran Wrap on your workbench. Wet out the cut lengths of glass on this, then use it to carry the wet glass to the work area. This prevents distorting the wet glass. Remove the Saran and stipple out any bubbles.
3. Put the firewall pieces on as late as possible. This allows you to continue working from the front as compared to the cramped area in the cockpit area. Use nut plates mounted on light aluminum plates to mount the voltage regulator and other mounted hardware on the front firewall wall. You'll be able to remove the hardware later if needed. You can also use





Fiberfrax ceramic cloth over the firewall and fuel tank front. Cover with .020 aluminum where heat baffles don't cover. Adhere cloth and aluminum with RTV. (Ed. Note: RTV may not withstand extreme heat. Use adhesive which can withstand the necessary heat). Fiberfrax can be purchased from Aircraft Spruce or Wicks.

4. Poor man's vacuum pump. On glass lay-ups, excess resin adds no strength--just weight. To get rid of excess resin, do the following: layout the part on your work area. On top of the wet glass, lay a piece of peel-ply or medium weight polyester cloth. On top of this place 4-5 layers of paper towels. The cover with a layer of Saran Wrap and a piece of plywood. Place heavy weights on top. The excess resin goes through the peel-ply and is absorbed by the paper towels. The Saran Wrap keeps you from gluing to the weights. Sometimes, if the plywood is cut to shape, you can get pressure in tight corners. C clamps can also be used for pressure in some instances. This technique can be used on the rear spars when attaching the aluminum tabs. You can also rotate the fuselage to apply pressure on the seat belt pads, inside and out.

5. Fire sleeves should be used on all fuel and oil lines in the engine compartment. They can be purchased from Aviall or ?.

6. By forcing a socket of the correct size over the end of the 5/8" reamer for wing spar mounting, you can use the ratchet wrench to rotate the reamer and apply pressure in the tight space. Hammer the socket on for a good grip. Incidentally, I rented a 1/2" angle drill to put in the preliminary holes before reaming. It made it fast and easy. It was well worth the \$10.50 charge.

7. Previously in making canopies, I always had trouble getting a good edge where the glass attached to the Plexiglass. Try this solution. After applying the masking tape to the Plexiglass to define the edge, lay out a length of Saran Wrap on your work table. Then measure a workable length of 2" glass tape. Lay it on the Saran Wrap, wet it out and then with a sharp scissors, cut about 1/4" off the glass and Saran Wrap. This will give you a straight edge which you can carry to the canopy, sliding it up to the masking tape. when it is in place, remove the Saran Wrap and stipple our any bubbles. Finish the balance in the same way. Incidentally, remove the masking tape when the epoxy hardens. Some brands of tape will cement themselves to the Plexiglass over time.

#### Don Surratt (Arlington, TX):

I picked up my Pulsar kit in a custom-built enclosed trailer in October, but did not start building until November. I have about 150 hours logged so far, all on the fuselage. I am complete through bonding the canopy to its frame.

Because of the number of layers of glass, and the severe angle in the main gear tab lay-up, I decided to bag the tabs and pull a vacuum using a hand vacuum pump purchased at Pep Boys Automotive. Once I got the leaks plugged this method gave a very nice smooth wrinkle-free lay-up on the gear tabs. A wet/dry electric vacuum is helpful in the beginning bagging stage for finding the vacuum leaks since it is not possible to pump the hand vacuum fast enough to determine where the leaks are. I also pulled a couple pounds of vacuum on the fuel tank just to convince myself I had made it leak-proof.

An X-acto #15 key hole saw blade with slight modifications will fit in a Black & Decker jig saw and will cut a very fine line. This is useful for cutting the aft access cover.

I used super glue purchased at a hobby shop to tack most parts in place. The beauty of this glue is with a firm knock of a soft mallet you can break the bond and reposition the parts to glue again. Once tacked, you can start right away putting micro and glass down. If there is a gap, use baking soda to form a small fillet, then 1 drop of super glue and you're ready to glass. Avoid breathing and eye contact with vapors because it will burn when the glue kicks off.

#### Joe Kneipp:

I am doing fine with my Pulsar (Serial #220). I did notice problems with the epoxy and cold temperature. I now keep my epoxy supply at 75°-80°F and warm the pieces to be bonded to about 70°F and everything seems to be fine.

When working inside the fuselage, you need to support the exterior of the fuselage. Otherwise you may break the bond on the fuselage flange. A 2"x4"x8' board, pressed against the exterior along the flange will provide additional support for the flange. You can use some short scrap pieces of 2"x4" to support the main 2"x4" board along the flange. It works great for me.

#### THE MAKING OF A PULSAR BUILDER (Allan Tweedie-Brunei):

Here's a little background information on my metamorphosis into a Pulsar builder. I visited the U.K. PFA Rally last summer (1991) at Wroughton in Wiltshire with the firm intention of placing a deposit on a Kitfox. I found the display, oohed and aaahed, sat in the aircraft, wiggled various controls, and reached for my checkbook. My wife, however, had other ideas and advised me to shop around before making my final decision. Putting my checkbook back in my hip pocket, I prepared myself for a last wander around the other displays and then perhaps my wife would allow me to sign THE check.

Within a couple of minutes, I had spotted the wing and front fuselage of Alan Gill's Pulsar, well camouflaged inside a green tent. The Pulsar, being in its original finish, blended well with the background. It did not take long for me to realize that for me the Pulsar had several advantages over the Kitfox....extra speed, style, comfort and a good overall published performance. It was obvious that my Finance Manager had been smitten by the smooth lines of the Pulsar, so after a short discussion over a cup of coffee, we reached the decision to buy the kit.

Knowing I could not rest with the kit sitting in the U.K. while I twiddled my thumbs in Brunei, I decided to purchase my Pulsar directly from Mark Brown in the U.S. and have it delivered to Boeing in Seattle...not, I might add, for purposes of evaluation against a Boeing 777!!!! Royal Brunei Airlines was taking delivery of a new Boeing 767-300 in mid-December, and I was a member of the team sent to oversee the transaction. So, with the thumbs up from the company, I had free transportation for the "big box".

Rick Meyer and the dispatch people at Boeing worked wonders and the kit arrived just in time to be loaded onto the new 767 headed for Brunei. Boeing staff fitted a second bottom skin on the box so it would easily slide on the 767's freight bay rollers. We set out from Seattle at noon on the 14th of December and flew directly to Brunei in 16.5 hours ( a Pulsar speed and distance record) and the following day the kit was unloaded. I was a little concerned about Customs but all went well. I had only one snag...as my freight was free of charge I didn't have an airway bill. It seems that without an airway bill, nothing exists. Although that may be ok for the import of a kit, my chief concern was for the smooth export of the completed kit, so I went ahead with import formalities.

It is my intention to build the Pulsar in Brunei under the U.K. PFA system of inspection. A local inspector has been accepted by the PFA for this single project. I will then send the completed main assemblies to the U.K., assemble them, have the final inspection from the PFA, then the flight test, and off I go. I think a similar attempt at certification and flight in Brunei (being a foreign national) would result in paperwork equaling the weight of the entire project (plus the crate!)

At present the box has been dismantled and resurrected as the wing assembly table. I have a very understanding "boss" who, rather than put up with the sighings and impatience, took down all our Christmas decorations to allow me to take over the large lounge for the next 18 months or so. With a steady outside air temp of 35°C and a humidity of 85%-90%, the air conditioner will be most appreciated. I'll be pleased to keep you all in touch as my project progresses.

### **FROM THE FACTORY:**

Flying the Pulsar for demos and service tests every day or so is really a fun job (at least for a year or two), but to really go somewhere for a change is a lot more interesting. That was the case for a recent trip to San Diego in the Pulsar XP. Lee Klaus, one of our west coast builders invited me out to the EAA Chapter 14 meeting in January and it was a real treat. They have the distinction of being the largest EAA chapter in the world and a reputation of being the friendliest. After sampling some of their hospitality first-hand, I can certainly testify that their reputation is well founded. I had a major brake problem as soon as I arrived at Brown Field and Chapter 14 immediately went into action. I had so much truly expert help that I never even got my hands dirty. My most sincere thanks go out to Lee Klaus and the entire Chapter 14 membership.

I must point out that the brakes that failed in San Diego were not the mechanical type that we send with the kits. The Pulsar XP belongs to Rick Meyer and he chose to install hydraulic disc brakes on his own. Needless to say, I prefer the mechanical brakes that we send with the kits.

The flight to San Diego was really a lot of fun overall. It took about 8 hours each way and the weather was great (for a change). I flew much of the trip above 12,000 feet and the Rotax 912 never missed a beat. In fact, I was a bit surprised how smoothly it did run at that altitude. Most engines start to run a little rich above 12,000 feet but the exhaust gas temperature on the 912 indicated an ideal mixture all the way up. I can only speculate that the diaphragm type carburetors are compensating somewhat for altitude. Also, I think that we have the sea level mixture a little on the lean side.

I only had to stop once in the 1100 miles each way for fuel. The 912 burned 3.5 gph at 5000 rpm. True airspeed was 135 mph at altitude. The reason it didn't quite do the published 140 mph is because Rick is still using the old 3-bladed prop. It really looks nice but its 5 mph slower than the 2-bladed prop that we send with the kits.

We've received a few questions about storing epoxy at low temperatures. We called Hexcel and they said that low temps, even below freezing, are not a problem. The only possible result might be the formation of some crystals in the hardener. The solution is simply to heat the hardener up to about 90°F and shake the container until all the crystals have dissolved.

We've received a report about a prop failure on an ultralight type airplane with a Rotax engine. The prop sheared off flush with the surface of the prop hub. The cause of the failure was fatigue in the threads of the bolt. Bolts are not capable of transferring the torque spikes from the engine to the prop. The only way to transfer the torque loads is through clamp-up friction between the prop and

the hub. Of course this clamp-up requires that the bolts be torqued very tight. The ultralight prop in question was apparently torqued properly on installation but several months later, after the summer temperatures dried out the prop, it shrunk so much that the bolts became loose. At that point, the failure was inevitable. The solution to the problem is to check the bolt torque on your prop at least twice a year. A torque wrench should be considered safety of flight equipment.

We've learned that a few builders have been using a dangerous technique to install their main spar pins. I know the pins are tight and sometimes difficult to install, but under no circumstances should you **EVER** "tap" on the pins to get them in. The bond line between the aluminum plates and the glass reinforcements is not designed for, nor capable of, reacting out-of-plane loads. Tapping on the wing pins can easily delaminate the glass from the aluminum which is obviously very serious. If the pins are difficult to install, coat the pins with grease and twist the pin in. If that still doesn't work, then your wooden stop block must have shifted after the holes were reamed through the spar and you should go back and add shims to the stop blocks until the holes are in line again. Also, be aware that after a few flights the wing pins will "set-in" slightly so the pins aren't quite so tight.

We've recently made a production change that I would like to explain. Due to the difficulty of obtaining aircraft grade Sitka Spruce, we've been forced to redesign the main wing spars using glass composite. The new composite spars are designed for the same gross weight as the wood spars and the construction procedure is almost the same. All kits shipped in 1992 have the composite spars.

#### **COMING IN ISSUE #16:**

- Working with dips and bumps on your wing skins.
- Wing tip assemblies--Pat Keesler.
- First flight considerations--Harry Jones.
- From the Factory
- Builder Tips:
  - Terry Baker
  - Ken and Shirley McWhinney
  - Gary Polizzotto

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Mike McCann, Editor

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# Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 16

Published by the Pulsar Builders' Association

May, 1992

## Miscellaneous Items/Notices:

• **OOPS!!!** It finally happened. Every computer user will know what I felt as I watched the final version of the May *Pulsar News* flash before my eyes. Just as I was saving the final version, my computer suffered a MAJOR crash and I lost not only the May issue, but everything on my diskette. As I am already running behind schedule, I didn't want to delay any longer. As such, you will notice many typos in this edition as I am using the draft version of pages 2-8 which I printed during a prior sitting. Please accept my apologies for the pen marks and I promise to be better prepared for this nightmare in the future. Please don't take offense if I spelled your name wrong. I just wasn't able to correct anything before THE CRASH!

• **Oshkosh '92:** Mark Burrow has graciously agreed to moderate this year's Pulsar Builders' Forum at Oshkosh. I talked to Mark and he asked that I solicit the builders for any slides or photos which could be used in the forum for discussion purposes. He also asks the builders to write him if there are topics of interest to present during the forum. Mark will meld all the input he receives into a presentation of interest and importance. Mark's address is:

Mark Burrow  
19107 E. 28th Terrace Court  
Independence, MO 64057  
(816) 795-8871

Please feel free to call Mark if you prefer.

• **Antenna Kits:** We've finally had to raise the prices of the antenna kits available for the Pulsar due to a 50% increase in the price of the copper tape and a 30% increase in the price of the torroid coils. The NAV/COM kit (which makes up to 5 Com,Nav,GS,FM antennas) is \$30 and the transponder kit is \$13. Shipping is \$3 (U.S.) and \$5 (overseas).

• **Questions for the Factory:** Have you ever had a question about the Pulsar or why something is the way it is, but never bothered to ask? Maybe you thought it didn't justify a call to the factory or (like me) were a bit embarrassed to ask. Well, now all you need do is drop me a note with your question. I'll gather them together and ask Mark for more information on each question asked and print his comments in the newsletter. And don't worry...you will remain anonymous.

• **Article backlog:** Well folks, I know I said in the last newsletter that I'd have builder input from Gary Plizzotto as well as information on wing skin bumps and valleys. Unfortunately, even though we expanded this issue, we still ran short of space. I'll print the wing skin article in the next issue and I'm planning to expand Gary's information to include pictures of his fantastic Pulsar. As always, your patience is appreciated. If you're having problems with the wing skins and wanted the information right away, just drop me a note and I'll send it to you right away.

## **BUILDER INPUT:**

Ken McWhinney (Northern Ireland):

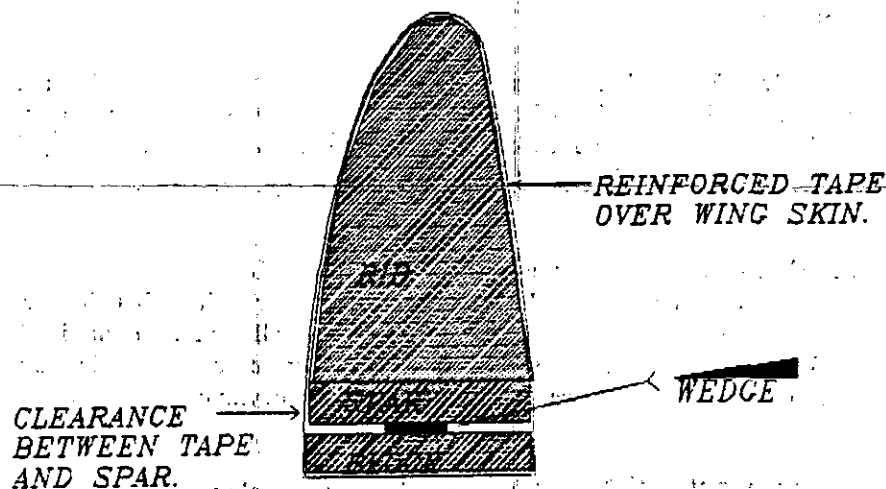
I have some builder tips which I have found useful in building my Pulsar:

1) You can use 4 heavy duty wood screws (2-3" and 2-4") which I screwed into my wing table in the relative positions where the wing twist blocks are meant to sit and I was able to clamp the corners of the spars on top of these screws to hold the wing twist while I did the skinning. I used the wing twist blocks to set the screws remembering to use the blocks on the alternate screws so that the screws were set to the proper heights. In fact I only used one block at each end as I subtracted the 1/4" block from each of the relevant heights.

When the wing dried after the first skin was installed I found that the wing twist was slightly different but when I repeated the same process on the other side as I had done previously, I increased the wing twist by 1/16th inch and when this side dried out, I found that the wing sprang back the 1/16th inch and is now nearly perfect.

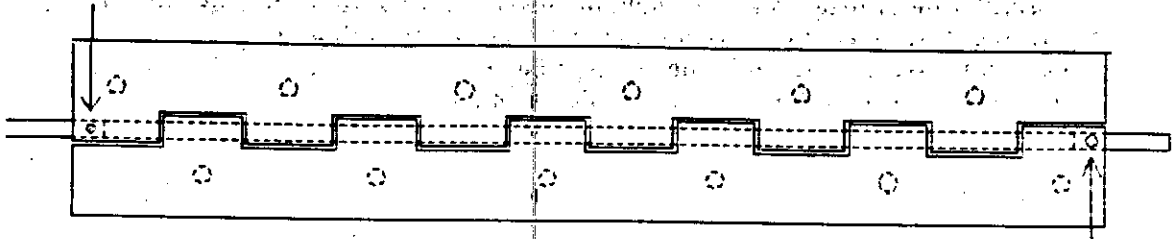
2) A little tip I found very useful when I was skinning the leading edge of my wings. I cut little blocks of wood from lengths of 1.5" square wood. These blocks were cut exactly 1/8" longer than the width of the main spar under each corresponding rib as shown in my sketch. I also cut a wedge 2" long and thickness starting at 1/4" to 0" for each block from the same material.

I wrapped reinforced tape over the leading edge skin and over the blocks lengthwise making sure that the tape cleared the spar equally on each side. I was then able to drive the wedges between the blocks and the main spar to tighten the reinforced tape. I found this so successful that I was able to use the wedges to true the spar.



### 3) Modification of Hinges:

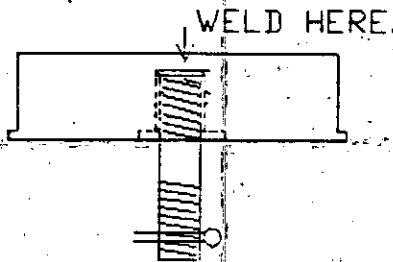
Six rivets are positioned so that each one is directly behind a hinge lug. Longer hinge pins can be used so that both ends can be bent to prevent accidental loss of the hinge pin. Alternative, a 1/16" hole can be drilled at either end of the hinge for wire locking or split pinning.



(Ed. Note: The factory has previously endorsed Ken's hinge pin suggestion of wire locking the hinge pins in place).

### 4) Rudder torque tube cap modification:

This modification is to enable builders to wire lock a nut to a stud welded into the end-cap lock tab. A stud can be made from a suitable long bolt by cutting off the end and threading the plain end. The stud is then inserted in the locking tab and welded into place. Additionally, a hole can be drilled through the locking tab and stud to wire lock the assembly in place. A suitable locking nut is then installed in the end of the bolt after the rudder is installed.



(Ed. Note: Great idea. Perhaps the mod. can be further simplified by using an AN bold with no shank (treaded along the entire length. The bold would be installed with the end protruding out the end of the end cap where it is inserted through the attach plate and locking nut attached. You can wire lock the nut in place).

## **FIRST FLIGHT CONSIDERATIONS: (by Harry Jones)**

(Ed. Note: Harry has been flying his Pulsar for some time now and has developed a Pulsar checklist for pre-flight through take-off as well as other "first flight" considerations. Mark Brown has reviewed it and found it to be very good. Let me encourage other Pulsar pilots to submit any checklists they find useful for the Pulsar and I will incorporate them into one checklist covering all phases of Pulsar flight in a future newsletter. The "soon-to-be" Pulsar pilots will really appreciate the information from all of you current Pulsar pilots!)

Before we go flying in our Pulsar (for the first time), there are several areas I'd like to address:

- Arrange for hanger space even if it is only temporary. The shelter from wind and dust as well as the comfort it provides makes it much more likely that you will do what needs doing now instead of when you get the airplane back home after a flight.
- Visit the control tower (or airport manager if uncontrolled). I was amazed at the help and goodwill which a photo of the Pulsar and I generated with a little conversation about the airplane's capabilities and my test plans.
- Make taxi runs until you are very comfortable with directional control. Check the brakes for overheating, especially if you have closed up the gaps between the pant and the gear leg to make it look pretty. I have found the mechanical brakes fully adequate just as Mark says. They seem to take 10 hours or more to wear in and hold properly. I found it necessary to bend the bands carefully so they rest against the drums somewhere on the aft third of the band.
- Cross-winds make fast taxi and take-offs more difficult and may require a little fancy footwork. With the wind no more than 10°-20° off the runway, you can normally forget the brakes after you have reached full throttle.
- You will probably find that your engine will develop more RPM during static run-up than during a take-off ground run. I think that you should see at least 5500 RPM by the time you reach 40 MPH and have a pre-determined abort decision in your mind if you don't see the minimum RPM. My engine was so stiff during the break-in procedure that I couldn't get more than 5500 RPM. Obviously, the "controlled destruction" as Rotax calls it, didn't take place and the engine wouldn't produce decent take-off RPM for many hours. If yours won't turn up at least 5800 RPM during the break-in, call Aero Designs and borrow the break-in prop for a repeat and for the first few flights. (Rotax says the reason the break-in procedure is so important is that it causes a lot of controlled, lap-in wear in a very short time.) A few hours after break-in I think you should get 5800 RPM at about 40 MPH and 6000 RPM or more after lift-off as the prop unloads a little.



- Low time Cessna and Cherokee pilots may find the Pulsar a little twitchy in the flare. It really isn't and I believe it is less prone to oscillation if mis-handled. Just be mentally prepared to be smooth with a light touch on that little stick.
- The Pulsar airfoil is very forgiving, but when planning your first approach, remember that the flaps add only drag and no lift, unlike most other airplanes. With 2 or 3 notches of flaps, you can get a hell of a descent rate going as you pull the nose up and slow to around 70 MPH on base or final. As such, you must use a hefty, short burst of power to stop this descent before attempting to flare. For first flights, it would seem easier to use one notch or no flaps, and plan to get the airplane slowed down to below 80 MPH on downwind. Start early because this take a while, and then you can carry a nice easy descent rate all the way around the pattern to the touchdown flare. Even with the power set at idle, you can't keep the airspeed from building if you put the nose down. Easing the nose up, you will find a wonderful controlled sink rate.
- Since they add no lift, don't use flaps for take-off and be sure to get them up before you advance the throttle on a touch-and-go. mark says it's OK to slip the Pulsar with flaps.
- The fuel gauge is very pitch sensitive. Mine reads 2 gallons more on a flat hanger floor than in level flight (a nice safety reserve). Be sure to check yours during your first few flights. If you keep a record of fuel consumption, you will soon gain a feel of the huge variation in fuel burn when cruising at 5200 and 6100 RPM.

### Pre-Flight Walk Around Checklist

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Water coolant level. Vacuum holding?</li> <li>• Valve oil level</li> <li>• Spark plug wires</li> <li>• Hose chafe or leaks</li> <li>• Hose clamps all tight</li> <li>• Gear box oil leaks</li> <li>• Muffler springs</li> <li>• Carburetors straight up</li> <li>• All wiring tight</li> <li>• Cowling screws tight (after inspection)</li> <li>• Spinner screws tight</li> <li>• Gear box backlash</li> <li>• Prop nicks</li> <li>• Nose wheel friction</li> <li>• Nose wheel pant tight</li> <li>• Brake cables</li> <li>• Tire inflation</li> </ul> | <ul style="list-style-type: none"> <li>• Landing gear cracks</li> <li>• Left wing tight</li> <li>• Left aileron: <ul style="list-style-type: none"> <li>- free movement</li> <li>- hinge pins secure</li> <li>- rod end bolt secure</li> </ul> </li> <li>• Left flap: <ul style="list-style-type: none"> <li>- same as for ailerons</li> </ul> </li> <li>• Static vent</li> <li>• Left stabilizer--twist it</li> <li>• Elevator <ul style="list-style-type: none"> <li>- free movement</li> <li>- hinge pins secure</li> </ul> </li> <li>• Rudder--to hinge secure</li> <li>• Right stabilizer--twist it</li> <li>• Right wing tight</li> <li>• Right aileron--check same as left</li> </ul> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### Where the wings just installed???

- aft spar bolts
- aileron short push rods--check 3 bolts
- pitot tube connected

## Pre-Start

- Fuel Quantity
- Master on; 12.5 volts or more
- Avionics on, ATIS, Altimeter set
- Frequencies set
- Transponder set to 1200
- Avionics off
- Set pitch trim, aileron trim
- Gas valve set to ON
- Seat belts, shoulder straps on
- Radiator valve open
- Throttle cracked open
- Prime
- Switches on
- Start engine
- Voltage > 14 volts

## Pre-Take-off and Run up

- Seat belts
- Canopy locked
- Controls free
- Water temp 160° +/-
- Radiator valve open
- Magnetos at 4000 RPM
- Transponder to ALT
- Clock, start
- Run-up to 6200 RPM

## FROM THE FACTORY:

The big rush for Sun N' Fun is finally over and we are pleased to report a really good trip. We flew both prototypes to the show and for a change we had fairly good weather. We only flew through a little rain near Baton Rouge but the rest of the trip was nice and "boring". I flew Rick Meyer's XP and erril Walker from our factory flew our original prototype with the Rotax 582 engine. Flying side by side, we can report very accurate fuel flow comparisons. The Rotax 582 burned its standard 3.8 GPH at 130 MPH true airspeed while the Rotax 912 burned an even 3.0 GPH at the same airspeed. Of course the 912 was running at a rather low power setting which explains the low fuel flow. We both had to use Aviation 100LL fuel most of the 20 hour trip and I'm encouraged to report no problem at all. Both engines ran very smoothly all the way.

The airshow itself was exciting, encouraging and tiring all at the same time. We visited with many of our builders and had a great time. A very experienced test pilot named Chuck Berthe flew the XP for a stability and performance check and he was very complimentary. Some of the results of these tests may be printed in *Kitplanes* in the future.

The most exciting part of the airshow for us was to see Gary Pollizoto's new Pulsar. He flew in from Atlanta and drew a lot of attention. In fact, the world famous aviation photographer, Howard Levy, spent so much time around Gary's Pulsar that I expect we'll be seeing some really good pictures in the magazines. I want to congratulate Gary on his excellent workmanship.

As you know from a past newsletter, Gary replaced the standard Bing Carburetors with an Ellison Throttle Body. His early flight tests have shown that the Ellison System reduces

the power output such that the engine will not turn the standard 44"x56" prop. We will report more on that when Gary completes his tests.

I'm very encouraged to hear that several of the Pulsars nearing completion will be test flown by very experienced pilots who've flown many different types of homebuilts. This is a very wise plan that will greatly reduce the risk of pilot error at a really critical time. On this subject, Jim King is nearing completion of his Pulsar and is looking for a test pilot. If any of you know a qualified individual, please send his name to Jim.

Rotax has issued a service bulletin affecting all 582 starter ring gears. A copy of this bulletin is enclosed and should be complied with as soon as possible.

In checking my structural analysis, I've discovered that the cutouts in the rear wing spar have a lower margin than most parts of the airplane. Therefore, I recommend that two layers of 9 oz. fiberglass be added to the rear spar in the area of the cutouts. The glass pieces should be 4" long in the spanwise direction and as wide as the spar. One layer on each side of the spar is best but if your wing is already built, you can put both layers on the aft side of the spar and be almost as strong.

We've revised the dimensions of the blocks that are used to set the correct twist in the flaps and ailerons. The new dimensions are: 1/8" for the aileron, and 3/16" for the flap.

Some builders have asked how I find auto fuel when I take cross country trips. Of course I don't always find auto fuel as I mentioned earlier, but I do check a reference book that lists all the airports that advertise auto fuel. You can get a copy of this book from:

Peterson Aviation, Inc.  
Route 1, Box 18  
Minden, Nebraska 68959.  
(308) 237-9338 or (308) 832-2200

I think I paid \$25 or \$30 for it two years ago.

I've just received a late word that Alan Gill's Pulsar has just completed a perfect first flight in the hands of a British test pilot. Our most sincere congratulations go out to Alan and Silvia on a job well done. This is a big step for the British Pulsar market.

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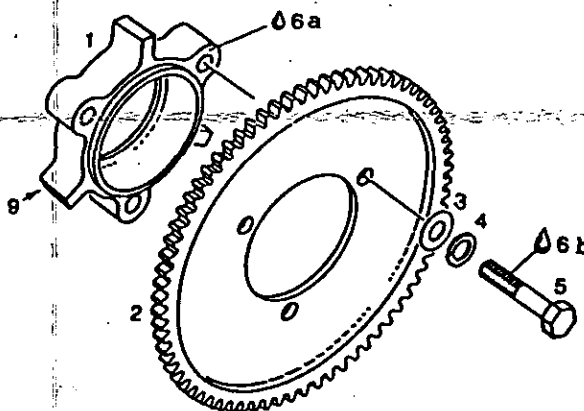
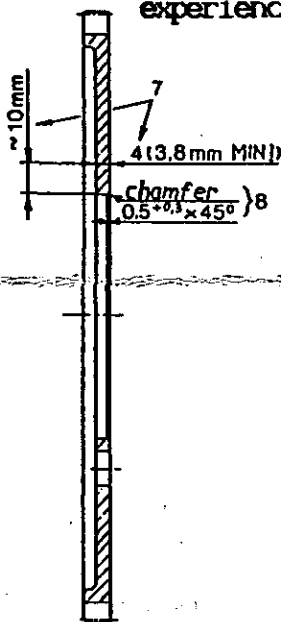
Mike McCann, Editor

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**Starter gear - electric starter, magneto side, on engine 582 UL****Instructions for checking of starter gear**

- 1) Remove the complete electric starter with starter gear from the engine.
- 2) Check the starter gear (pos. 2) visually for cracks with a magnifying lens (approx. 5-fold magnifying). Replace if cracks are found.
- 3) Check wall thickness (pos. 7) of starter gear in the area as shown on the illustration (in approx. 10 mm (3/8 inch) distance from the inner diameter). Exchange gears with less than 3,8 mm (0.149 inch) thickness.
- 4) Check chamfer 0,5 x 45° (pos. 8). 0,5 mm (0.020 ") is important to allow full contact with starter gear adapter. Rework if necessary.
- 5) Check starter gear adapter (pos. 1) to have the 3 supports (pos. 9). If old version without these supports, please exchange adapter.
- 6) Refit the starter gear, applying LOCTITE 648 (pos. 6a) between starter gear adapter (pos. 1) and starter gear (pos. 2), and fix it with 3 each shims 250 311 (pos. 3), lock washers (pos. 4) and hex. screws M8 (pos. 5). Tightening torque 22 Nm. (195 in/lbs/17ft/lbs) applying LOCTITE 242 (pos. 6b).
- 7) Fit the remaining electric starter parts.

Note: This work should be done by a service centre, oem, or experienced person.



# *Pulsar News*

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 17

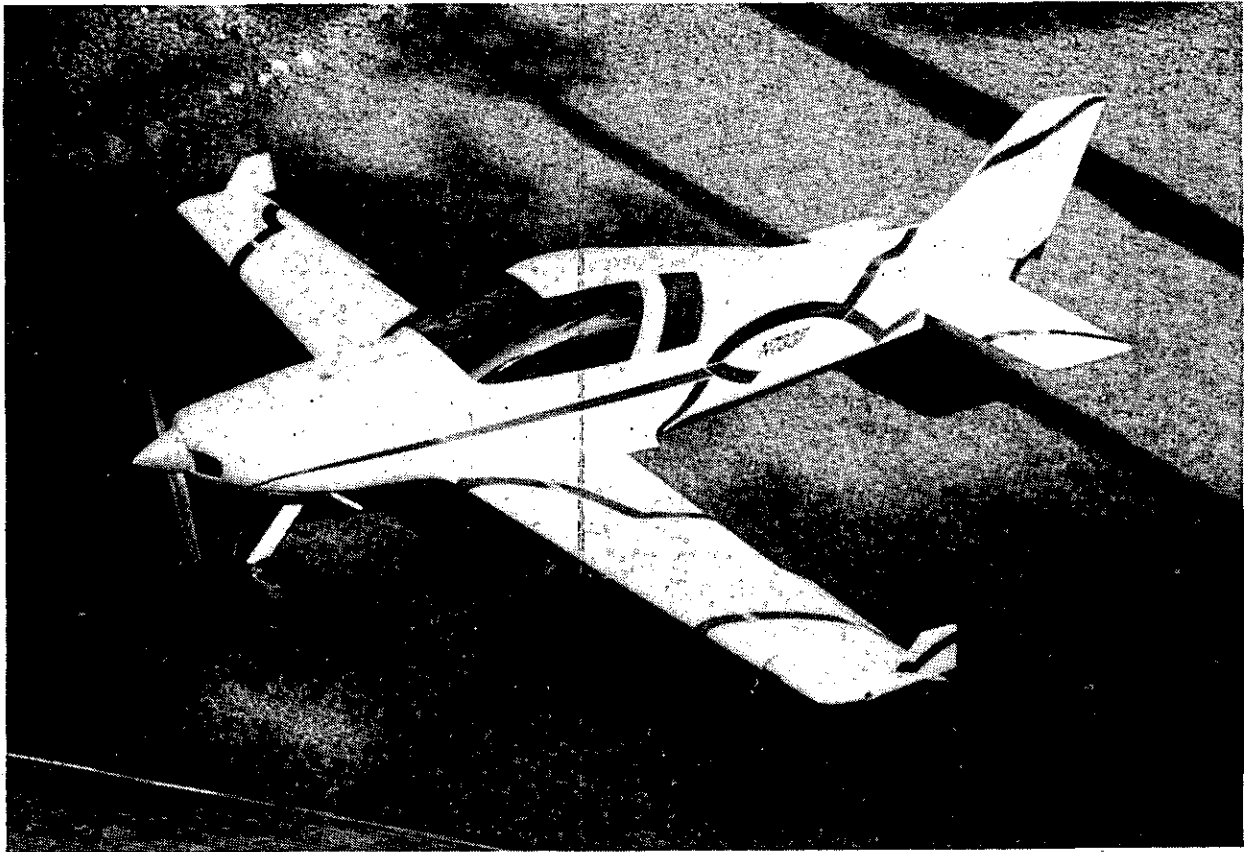
Published by the Pulsar Builders' Association

July, 1992

## *Special Oshkosh '92 Issue*

The enthusiasm for homebuilding and flying always seems to peak around the end of July in Wisconsin. This issue of *Pulsar News* is being distributed to future Pulsar builders attending Oshkosh '92 from around the globe. We wish to welcome them and invite them to share in the fun of building and flying Pulsar aircraft.

### **PULSAR by Gary Polizzotto**



Story on Page 2

(Ed. Note: Gary has made many modifications to his Pulsar which were approved by Mark Brown on a special case basis. Mark has not approved any of the discussed changes for general builder use. Also, refer to Pulsar News #13 for a detailed discussion of Gary's building modifications and photos).

"I am sending you some photos of my completed Pulsar. I thought you might get a kick out of seeing these. The following is a partial list of the modifications:

- Wings shortened 20" and heavily strengthened.
- Winglets installed.
- Dorsal fin modified.
- Rear windows constructed and installed.
- Horizontal stabilizers have been bonded to fuselage.
- Canopy top has been partially painted.
- Cowling intakes restricted 30%.
- Stainless steel firewall installed.
- Ellison throttle body injector with mixture control installed.
- Larger tires and landing gear leg fairings.
- Brushed aluminum panel with artificial horizon (driven with a venturi).
- Armrests constructed and installed.
- Cabin heater installed.

I'm happy to report that my Pulsar's maiden voyage was to Sun N' Fun '92 and it seemed to do quite fine. I'm not sure yet about the Ellison Throttle Body installation. It work's very well with the mixture control, etc., but Mark Brown seems to think it is not putting out the power that it should. I've just switched back to the Bing carburetors for a back-to-back comparison, and so far I haven't noticed any change in performance. However, it's clear that I'm down on power somewhere at the moment as the plane will only do 130 MPH. With the changes I've made to it, my Pulsar should be cruising 150 MPH. Fuel consumption with the Ellison was in the 4.5 GPH range at 5,800 RPM which seems about right according to the ROTAX charts. The engine has yet to turn full rpm and it is prone to bog down (5,000 - 5,300 RPM) on take-off, so my take-off distances are also longer at the present. Mark says that this engine really comes alive at about 40 hours time of use. We'll keep you posted.

The airplane flies very nicely, actually hands off when trimmed (I actually read magazines coming back from Lakeland). But one needs to re-trim the elevator every 20-30 minutes as fuel burns off. The electric aileron trim turned out to be very useful also. The ailerons are quite heavy at cruise at their limits with the center throw being very comfortable and easy. This allows for quick 45° to 45° banking easily before they tighten up. This may be normal, due to my winglets or whatever. I don't know. I do know I was much more rested arriving in Lakeland than I was when I would fly my Glasair II the same distance (in a little over half the time!). The Pulsar is very comfortable and much more relaxing especially with the armrests.

I did get to do some air-to-air photo work with the Kitplanes photographer. I think he thought the paint job was kinda funky! Empty weight on 733F is about 515 lbs. which is somewhat fat. However, the entire structure is heavily beefed up and it also has a full baggage area, complete interior, the extra weight of the winglets, dorsal fin, electric trim, etc... Due to the shortened and strengthened wings, Mark increased my gross weight to 1,000 lbs. so that works out fine for me. Flutter testing to 160 MPH has so far revealed no problems (thank you Lord!).

Also, another Pulsar builder was looking for help on shielding engine noise. Supposedly the tachometer wire from the engine can cause a great deal of radio noise. It (along with the plug and CD boxes) should be shielded.

Anyway, hope you find this useful.

### Oshkosh '92 meeting dates:

Pulsar General Forum: Tuesday, August 4, 8:30am Tent 3

Pulsar Builder's Meeting: Tuesday, August 4, 7:00pm Tent 8

As always, tent locations are subject to change so be sure to check the Forum board to confirm locations. We look forward to seeing many of you there.

As an aside, I have been asked by a couple builders if a recording of both meetings could be made for those people who won't be able to attend Oshkosh. This is a good idea and I'll be working with Mark to put this together. The next issue will have the details so stay tuned.

I have misplaced a note received from one of you who is organizing a "Pulsar camp" at Oshkosh. My apologies for this foul-up. Anyone who is planning to camp may want to check in at the Aero Design's exhibition tent for information on where the camp is. I'll ask the organizer to leave directions with Mark and Phil at the tent.

### Wing Skins -- Chick Torbett (Evergreen, AL)

(Ed. Note--Chick's Starlite was built prior to the factory procedure changes to include applying fiberglass cloth to the wing skins. I found Chick's step-by-step application process useful for Pulsar builders who will be applying the fiberglass cloth to their wings).

From day one, I began having problems with the thin plywood wing skins "oil canning" with changes in humidity. One day they would be nice and smooth and the next day they looked just awful.

I had several written "conversations" with the factory, but they had no real answer. To consider re-skinning the wings was sickening. I really felt that the skinning job wasn't the problem. After much arguing with myself, weighing the pros and cons, I elected to add a layer of fiberglass to the wings. My thinking was that if I could stabilize the wood, I could take care of whatever permanent "dips" existed with a thin layer of light weight body filler. I settled on a 3.16 oz. crowfoot weave tooling cloth. I must say that application to the second wing went better than the first.

I started with the lower surface and laid out the fiberglass cloth with the factory edge along the main spar on the top surface. My goal was to end up with a single ply of glass from the main spar aft, and a double ply layup around the leading edge "D" section.

I realized early on that the only way to cover such a large area was to lay the cloth out dry and smooth out any wrinkles. I then mixed up my epoxy and used a bondo squeegee to spread the epoxy out and work it through the cloth. I started on the lower side of the wing first with the wing laying on the work table. After the cloth on that side was saturated, I lifted the wing onto a couple of saw horses, trailing edge down and completed the wetting of the cloth around the leading edge to the spar area on the top side.

The entire process for one half of the wing took about 1 hour. The following day, I sanded the area forward of the spar that would be covered by the overlap of the cloth on the wing surface. I repeated the drill of the day before and put the wing aside until the next week-end.

The next step began with a thorough sanding with a random-orbital sander and 80 grit paper. This knocked down any spots picked up during the wetting out of the cloth. Now to level out those unsightly "dipsey doodles" in the wing surface.

I must point out that there were no obvious "raised" areas in the skin. All of the problems were "depressions" which could be easily taken care of with a thin application of plastic body filler. I chose a product called RAGE, produced by Evercoat and available at many auto paint dealers. A couple of close friends are professional fender and body men and they both recommended this product very highly. After trying it, I saw why. It isn't cheap (about \$20 per gallon) but take my word for it--it's worth it!

Most "bondo" type products clog up sandpaper and don't dry to a hard finish. I fully expected the same with RAGE but not so! It dries to a very hard finish and sands easily. It is heat sensitive like all the rest so you have to vary the amount of hardener you use or it will set-up before you can get it where you want it. Experience is the only solution here. Enough for the "commercial".

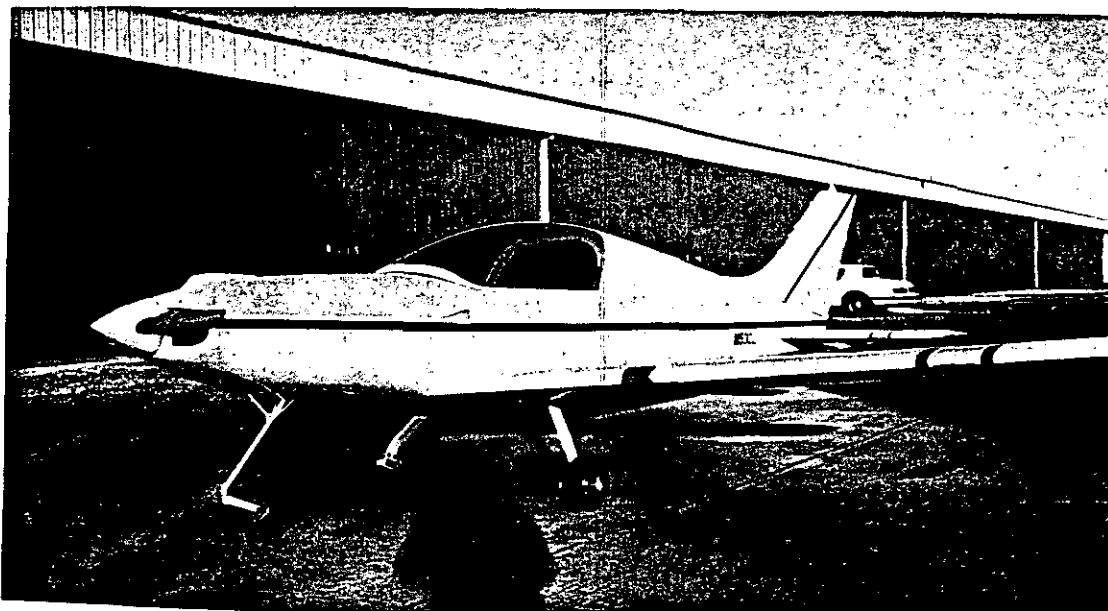
Anyway, I just laid on a thin coat of filler and let it dry. I worked it down with an in-line sander (a random sander will also work) like I wanted it using 80 grit sandpaper. When I had it like I wanted it, I changed to 180 grit paper and removed any obvious scratches left by the courser paper. Total filling and sanding time is estimated at 8 hours per wing.

Wipe the whole wing down with Prep-Sol lacquer thinner and prime with Dupont 131S dark gray Fill-N-Sand. I haven't put on my top coat yet but from what I've seeing so far, I'll have a decent looking wing.

(Ed. Note: the factory recommends using a 3" short nap paint roller (Shur-Line 03000 works great and is available at most hardware stores) in applying the epoxy instead of a squeegee).

### Chuck Stroh (Oklahoma City, OK):

Shortly after completion of my Pulsar in November, 1991, I realized the Rotax 582 needed a thermostat to help keep the engine at a constant temperature for peak performance.





It's been six months since I installed the thermostat and have flown in temperatures ranging from 15° to 85°F. The highest temperature recorded on the temperature gauge has been 160°F on climb-out to 150° during cruise. Now that I've thoroughly tested it, I would highly recommend installation of the Rotax thermostat.

The thermostat will fit in the outlet housing in the center of the cylinder head. The thermostat will come with a new square O-ring seal. The thermostat will fit in the groove of the O-ring.

To install the thermostat, a few things have to be done to insure proper installation and operation:

- 1) The pointed end of the thermostat must face the radiator;
- 2) This is critical--you will have to do some plumbing to ensure water will continue circulating through the engine while the thermostat is closed. Failure to do this will result in engine damage. To do this, I reinstalled the nipple that came with the engine back into the cylinder head. I then soldered an identical nipple in the radiator filler neck just below the lower seal of the radiator cap.
- 3) Once Step 2 is complete, all you have to do is connect a hose between the two nipples and clamp it tightly with hose clamps. I used a heavy wall vacuum hose so it would handle the pressure, and it is also fuel and coolant resistant. Be sure you protect the hose from chafing.

Another added benefit is you will never have to bleed the air from the coolant system when you add or change coolant.

I hope this helps you Pulsar flyers and builders who would like to have a warm, constant engine temperature. I have flown 60 hours since I installed the thermostat and so far it works great.

I am still looking for a way to quiet the electrical and ignition system on the Rotax so my Loran will work. Right now, there is so much noise, it will trigger the transponder at random. If any of you fellow builders have any ideas or have tried something that works, please give me a call at 405-722-4125. If you can help, I don't even mind if you call collect.

### From The Factory

We have lots of congratulations to send our this time. New Pulsar pilots are: Mark Burrow of Independence, Missouri, Ken Fernald of Fuquay-Varina, North Carolina, and Geoff Webb of Rugby, England. These are all beautiful Pulsars according to the pictures. I think we are almost as proud of these new airplanes as the owners. I want to express my sincere appreciation for a job well done by these good friends.

As Mark Burrow's Pulsar was being proof tested, a spin problem developed that could have been disastrous. I just have to thank the Lord for his protection and for Mark's wise choice to use an experienced test pilot for these tests. First, I want to emphasize that this spin problem should not affect the way a Pulsar is normally flown. Recovery from an unintentional spin is no problem at all because the recovery would not be delayed as with an intentional spin. In fact, even a full one turn spin is no problem. Only when a spin is allowed to continue past one turn does the spin flatten out and stabilize. Mark's test pilot, Jim Garrison, had no problem with the one turn spins. Recovery was quick and positive. However, after two turns, he reported the the nose came up and he could not recover with full controls opposing the spin. Finally he used full power which pulled him out of the spin.

Of course, I've spun our prototype Pulsar more than two turns without any problems so we are trying to understand what could cause the difference in Mark's Pulsar. Sometimes an extreme aft c.g. condition will cause a spin to flatten out but in Mark's case we've confirmed that his Pulsar is well within the limits. The only difference that we've noted is that his Pulsar is about 100 pounds heavier than our prototype, and his Pulsar is a taildragger. One of these differences must be the reason for the spin difference.

No matter what the cause, the conclusion is the same. Intentional spins must now be prohibited in all Pulsars and if an unintentional spin occurs, recovery must not be delayed. If the aileron and rudder controls are quickly applied in the direction opposing the spin, recovery is quick and positive.

A revision to the Pulsar Operating Manual regarding spin testing and spin recovery procedures is being sent directly from Aero Designs to all Pulsar builders.

Rotax has issued a Service Advisory requiring all 582 owners to replace the rubber intake sockets on the carburetors. This Service Advisory will be sent out to all Pulsar builders along with the revision on spin testing.

On the subject of brakes, we have discovered that if you grease the brake cables before threading them into the cable housings, the brakes work much better. They are smoother and even have more holding power.

To secure the rod-end bearings in the control system, the early Pulsar manuals called for drilling and safety wiring through the shank of the rod-end bearings. Due to the stress concentration caused by drilling the shank we've changed the manuals to use a jam nut or "Locktight" in the threads to secure the rod-end bearings. If you've drilled any of your rod-end bearings, they must be replaced with new bearings. Call the factory for replacements.

We've received some exciting news from AOPA magazine and Kitplanes magazine. They will both have the Pulsar on the cover and a feature article in August. Both articles are very positive and interesting so if you get a chance you might read what other writers impressions are.

### Wrap Up:

Thanks to Gary and Chuck for sharing the information with us. As more Pulsars take to the air we'll try to include more flying-oriented information. We also plan to feature more topics dealing with the "final" stages of construction. Issue #18 will contain articles on Pulsar lighting. In Issue #19 we will take a look at instrument panels--construction alternatives, design layout and style. As always, I welcome suggestions from all the builders for future topics. Just drop me a note. See you at Oshkosh.

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All correspondence should be sent to:

**Pulsar Builders Association  
P.O. Box 13941  
Scottsdale, Arizona 85267**

**Mike McCann, Editor**

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# Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 18

Published by the Pulsar Builders' Association

September, 1992

**Late Notice---** As we go to press, Phil Durieux contacted me with information on the Pulsar brakes:

"Aero Designs has learned that some Isusu band brakes shipped to some builders are not the correct size. We don't know when the switch was made so all builders should check their band brakes. The gap between the two ends of the band should measure only 1.25". The incorrect brakes have a gap of 2.75". The larger size gap causes too much stress on the cable when you try to pull the brake against the hub. If you have the larger-gapped brakes, we will replace them. If you have not yet installed them on your Pulsar, or if you have but they are still in new condition, please ship them back to us for replacement. If you've already used them, or they are a bit abused, don't bother shipping them. Just let us know you need the correct band brakes."

## Oshkosh '92 Forum Recap

### General Pulsar Forum

There was a good turnout for the general Pulsar forum. Mark talked at length about the new Small Airplane Certification Compliance Program and his plans to submit the Pulsar to the FAA to begin the process. Mark stressed that the certification program would be done through a separate company and that all future "certified Pulsar" activities would be completely separate from Aero Designs and the Pulsar kitplane program.

Mark also discussed his plans to study controllable props and a new 2 stroke Rotax engine for the Pulsar. However, these programs would likely not begin until 1993.

Lastly, there was a brief discussion on the new composite spars which are supplied with the Pulsar kits. Mark explained why the switch was made from Spruce to composite (which has been detailed in previous *Pulsar News* issues).

### Pulsar Builders' Forum

Mark Burrow did a great job as coordinator of the builders' forum. Mark gave a short slide program on the construction and painting of his Pulsar and shared test samples of the different finishing/painting steps. Everyone consistently states that the learning curve for the first-time finisher/painter is the biggest hurdle. Both Mark and Pat Keesler commented on tasks they would do differently "next time". Perhaps I can persuade Pat or Mark to send in some of their hints for everyone's benefit!

Mark discussed his flight test program and the spin problems he had during testing (discussed in #17). The point Mark stressed was how smart a Pulsar builder is when they decide to turn over the "thrill" of the initial flight tests to an experienced pilot who understands light aircraft. There are Pulsar builders who have the necessary experience to do their own flight testing, but the majority of us probably don't fall into that category.

## Miscellaneous

Pulsar For Sale: I have received word from Jim Devorak that he is interested in selling his Pulsar 582. Jim (always demonstrating his interest in new activities) has decided to join the Navy. He was very disappointed to hear that the Navy will not allow him to base his Pulsar on the deck of the aircraft carrier. Given the generous "runway" lengths on a carrier (at least for a Pulsar) we can understand his disappointment.

Jim's Pulsar has 100+ hours flying time and was the recipient of the Oshkosh 1991 Outstanding Workmanship Award. The Pulsar is equipped with a King KX99 and King LCA200. Asking price is \$32,500 OBO. Jim's telephone number is 612-864-5162. For mail correspondence: 940 11th Street East Glencoe, MN 55336. Good luck Jim in your new adventure!

### Oshkosh Audio Tapes:

In Issue #17 I mentioned that we would try to make available either audio or video copies of the Pulsar & Pulsar Builders' Forums. At Oshkosh, I learned that audio tapes are available for virtually all forums through *Sport Aviation* magazine. Cost is approximately \$6.00 per forum. The Builder's Forum was not taped by EAA and my attempts to videotape the meeting failed due to poor lighting. I have attempted to recap the Builders' Forum previously in this issue.

Copperstate '92 Fly-In: Several Pulsar builders are planning to attend this year's Copperstate fly-in in Prescott, Arizona. In past years, we have gotten together for a fun-filled dinner Saturday evening where we make excuses about why our Pulsars aren't done yet. If anyone is planning to attend, please feel free to call me for more details (602-482-7882).

### Gary Polizzotto Follow-up

Gary sent in the following info. to supplement the information presented on his Pulsar in #17.

"I think I mis-typed some figures in the write-up to the Pulsar builders and I wanted to correct that so some others don't get frustrated trying to make the Pulsar do some impossible things! The mis-stated figure was the projected cruise speed of 150 mph. My actual goal was 140. The following information is the result of timed runs against and with the wind over a known distance and are averages of 6 passes:

5,400 rpm = 130 mph TAS  
5,800 rpm = 140 mph TAS  
6,700 rpm = 158 mph TAS

The top speed of 158 was at 5,000', 80° F, high humidity and without the nose gear fairing. This figure is correct as it also plays out on the E6B when you do the pressure altitude/temp conversion for IAS vs. TAS. The exciting part for me and my efforts on the plane however, is its cruise speed of 140 at about 75% power. This along with a top speed of 160 mph had been my goal with the modifications. Stall speed (power on) is at an indicated 43 mph, but I don't think that is particularly accurate at that angle of attack.

To make the static port "button", use a small drop of epoxy 3/8" in diameter, 1/16" thick and place over the hole in the fuselage. Remember to drill a hole in the center of the button.

I have made the decision to stay with the Bing carbs. They definitely put out more power than the Ellison on my application and I can just about pull 6,000 rpm on static.

A few other ideas that may prevent some mishaps: put a copper nicopress sleeve on the lower end of the brake cable outside of the brake band. I had a cable pull through the brass crush tube and almost bought a new fender for a Mustang as the plane pivoted around the other wheel!! Also, a small turnbuckle at the top end of the brake cable to pedal junction allows for easy adjustments of the cable. keep an eye on the bottom side of the 90° exhaust elbow. For some strange reason I keep developing small cracks there.

### Builder Input

Bill Conrad--"To those who haven't mastered dispensing micro from a plastic bag try this:

- 1) Take a toothpaste tube and cut off the crimped end. I use the large size Crest with the flip top.
- 2) Clean out the inside and let dry.
- 3) Drill a small hole in the flip top. I drilled a 3/32" hole. You can now extrude two size beads of micro.
- 4) Open the cut end and fill the tube with micro. Close the cut end with a spring type paper clip.

Applying micro now is as easy as putting toothpaste on your toothbrush"

John Bentley--"Builders might find the April-June, 1990 issues of "Sport Aviation" very useful. There was a series of articles on electrical systems which is very helpful. Secondly, the compass will mount above the instrument panel under the canopy. Just use a bracket and nut embedded in the joining V for a 3/16" bolt.

I am close to the finishing stage--just a few days to glass the wings and complete the instrument wiring."

### Pulsar Lighting

As was promised in issue #17, I would like to feature information from two Pulsar builders regarding Pulsar lighting. Many of you have expressed interest in this topic. Pat Keesler has done quite a bit of work designing nav and strobe light assemblies for the Pulsar (Aero Designs approved). Larry Eubanks has recently presented a landing light design which Aero Designs has approved (see From The Factory). I encourage all Pulsar builders who would like to share their information or experiences with lighting assemblies to please contact me.

#### **1) Nav & Strobe Lighting Assemblies.**

Pat first began work on developing nav light assemblies which would be simple in design, easy to construct, and utilize readily available parts. The most time consuming part of the project was forming the plexiglass lenses for the wingtips. Pat decided to contain the light assembly within the wingtip for improved appearances. After making plaster molds of the wingtips, he stretch-formed clear plexiglass over the mold to create the desired shape. After trimming the excess from the plexiglass lens, he cut an identically-sized opening in the wingtips. Picture 1 shows the openings with the lip that Pat constructed to attach the lens to. The lip can be easily fashioned with standard fiberglass. Two rivnuts are mounted into the lip to screw the lens into the wingtip.

The second picture shows the actual light assembly which is mounted inside the wingtip cut-out. Mirrored plexiglass is used to make the frame for the nav light assembly.

Two hardpoints are constructed within the wingtip to attach the L-shaped plexiglass to the wingtip. The lightbulb holder is from your local auto parts store which carries numerous sizes of bulbs and holders. Pat routed the power cable through the foam ribs. (Ed. note: You can use inexpensive plastic "irrigation" tubing found at home improvement stores as a flexible conduit to run the power cables from the wingtip to the fuselage. Even after you close the wing, you can easily run additional cables through the conduit. The conduit is available in 1/2" sizes and weighs approximately 8 oz. for a 12 foot length).

Pat has also developed clear plexiglass lenses for the Pulsar tail and wingtip strobe lights. The tail light is mounted just below the rudder and is wedge-shaped. The builder can make a cut-out in the fuselage and the tail lens will slip into place for bonding. The lens has the hole for the bulb holder already built in and uses mirrored plexiglass for additional lighting performance. (Sorry--no picture available to show).

The strobe lens is a small lens which attaches with two screws (Picture 3). The actual strobe light holder is left to the individual builder.

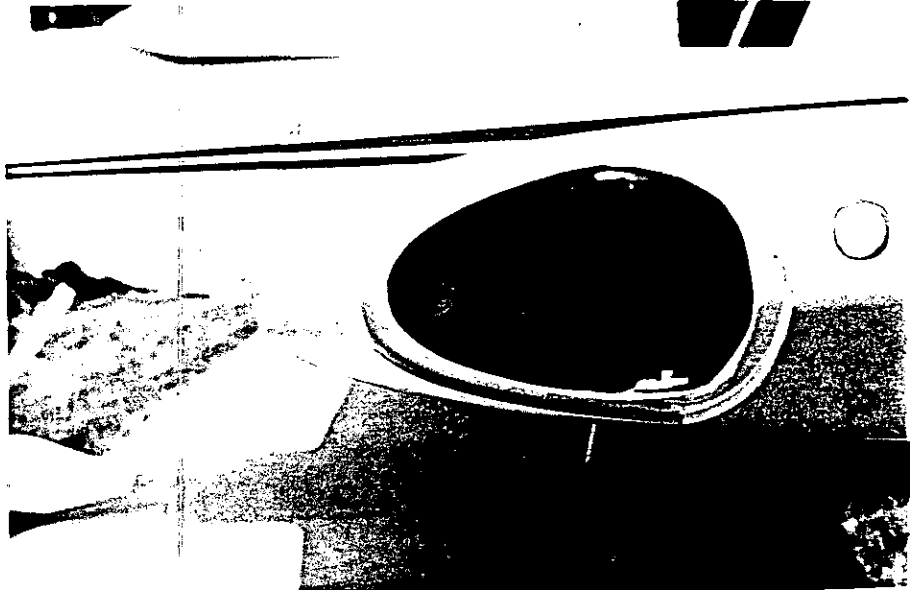
Pat will sell lenses to Pulsar builders. He has also notified me that the nav lenses are now available in both clear and colored (red and green). Prices are as follows:

Nav lenses (clear or colored): \$45.00 per pair.  
Strobe lenses: \$20.00 per pair.  
Tail lens: \$60.00 each.

Please add \$5.00 US (\$7.00 overseas) for packing and postage.

Pat Keesler  
1112 Breezewood Lane  
Neena, WI 54956

Telephone: 414-729-5751



## 2) Landing light assembly.

Larry Eubanks unveiled his new landing light assembly during this year's builder forum. Photo 4 shows the light assembly mounted in a sample of the Pulsar wing. It requires a very small opening in the wing and weighs only 6 oz. The light bulb is a 55 watt halogen bulb which draws only 4.5 amps. Since the light is used for only short periods of time, even the Pulsar 582 can handle the power load.

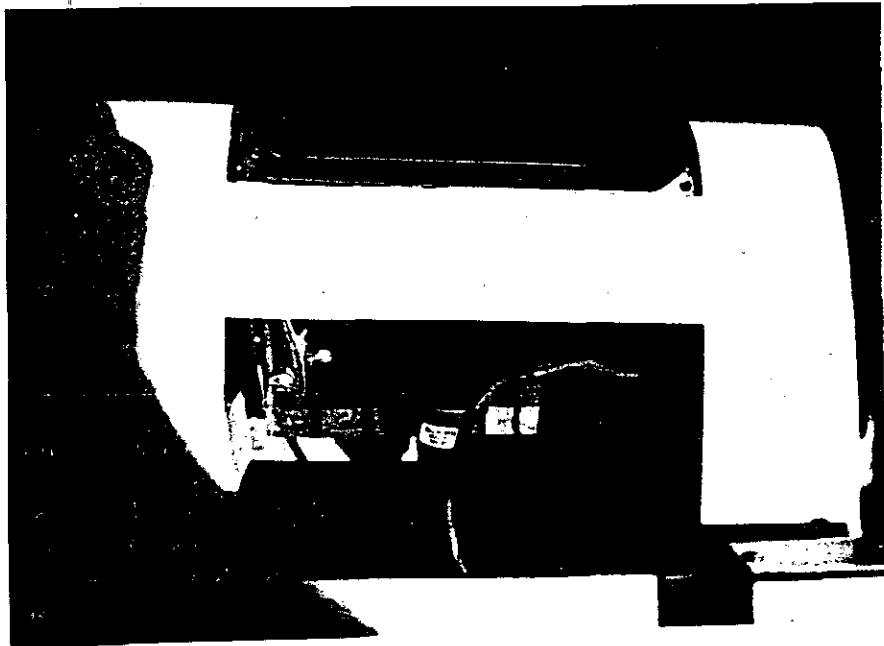
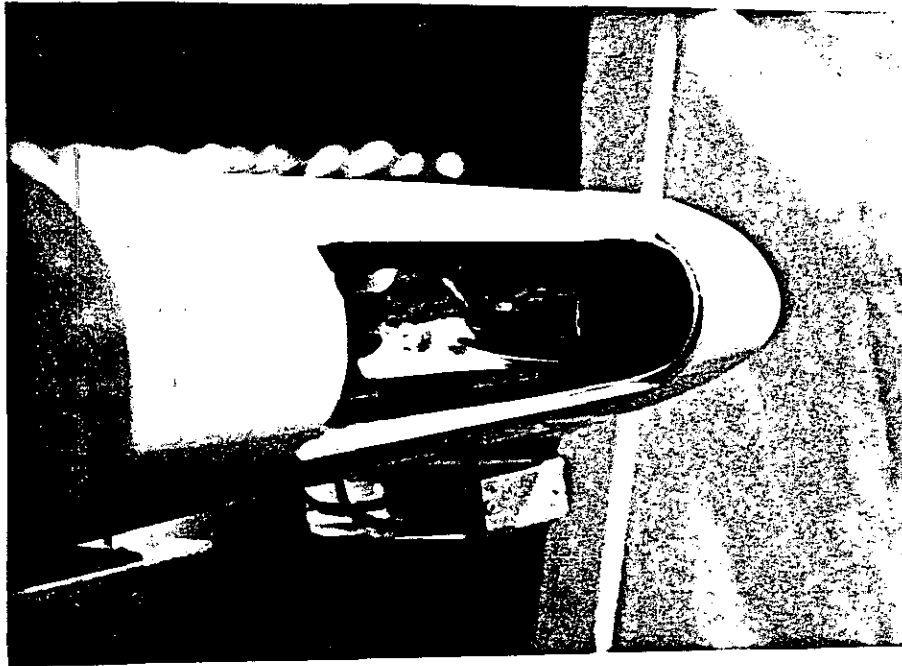
The bulb housing is made of mineral reinforced nylon. The mounting brackets are made of aluminum and feature a 6-way adjustment for proper light direction. Larry notes that the bracket is designed to fit between ribs 7 and 8, but is easily adaptable for other areas of the wing.

Photo 5 shows the underside of the sample "wing" and the cutout aft of the lens opening. This cutout is necessary for access to the bulb and wiring. Aero Designs has approved this light assembly provided the builder follows the directions for the mandatory reinforcing around the two cutouts.

Prices for the landing light assembly are \$45.00 plus shipping (amount not specified). Anyone wishing to contact Larry:

Larry Eubanks  
Route 2, Box 220E  
Lawrence, KS 66046

Telephone: 913-842-5261



## From The Factory

More Pulsars are heading in the wild blue yonder! Our most enthusiastic congratulations go out to Martin Faro of Dorset England, David Bailey of Chariton Iowa, Pat Keesler of Appleton Wisconsin, and Fernando and Bira Abbud of Goiania Brazil. All of these good friends have earned our respect and admiration for a job well done.

Speaking of well done, Mark Burrow flew his Pulsar to Oshkosh and won the Outstanding Workmanship Award for kitbuilts. We all congratulate Mark and thank him for running the Pulsar Builders' Forum at the airshow.

Another new Pulsar at Oshkosh was flown in by Pat Keesler. His airplane was so perfect that I think it could have won Grand Champion but he didn't have the required flight time on it to be eligible for judging. Bring it back next year Pat.

Bob Townsend flew his Pulsar back again this year which meant that three champion quality Pulsars were all parked in a row next to our ragged old prototype. Rick Meyer flew his work-of-art Pulsar XP to Oshkosh too, but we talked him into parking it in the exhibit area next to our tent. All in all we had a really good airshow. Interest in the Pulsar was outstanding and two more magazines did interviews and pictures for future articles. The flight to Oshkosh was uneventful. (Almost getting to be a routine).

At the Pulsar Builders' meeting Larry Eubanks showed a very neat landing light system. We've approved the installation after adding some glass doubles around the cutout so if you plan to install a landing light, contact Larry at RR 2, Box 220E Lawrence, Kansas 66046. His home phone is: 913-842-5261. (No collect calls please).

We noticed at Oshkosh that the nose gear castor friction was inadequate on a couple of the Pulsars. This problem usually develops because the fiber lock nut doesn't hold well enough. We now recommend that you obtain a castleated nut and cotter key it to the nose gear pivot shaft so it can't back off and lose friction. If the friction is too low the nose wheel could shimmy and destroy the nose gear structure.

We've confirmed the builder reports that the wheel bearings in the large wheel option (6" wheels) are inadequate for the speed and load range of the Pulsar. We've solved the problem by machining out the wheel to accept a high quality tapered roller bearing. The cost of the machining and the new bearings is \$75 plus shipping.

That's all the news for now but I want to thank each and every one of you Pulsar builders for your friendship and your good work. I've seen a lot of Pulsars now and I'm really impressed with the quality of your work and your willingness to share your good ideas with others. Especially at the airshows I notice an attitude of cooperation and helpfulness that is truly inspiring. In fact, we at Aero Designs literally couldn't successfully represent the Pulsar at the airshows without the diligent help from so many of you builders. Sincere thanks from all of us.

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Mike McCann, Editor

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# Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 19

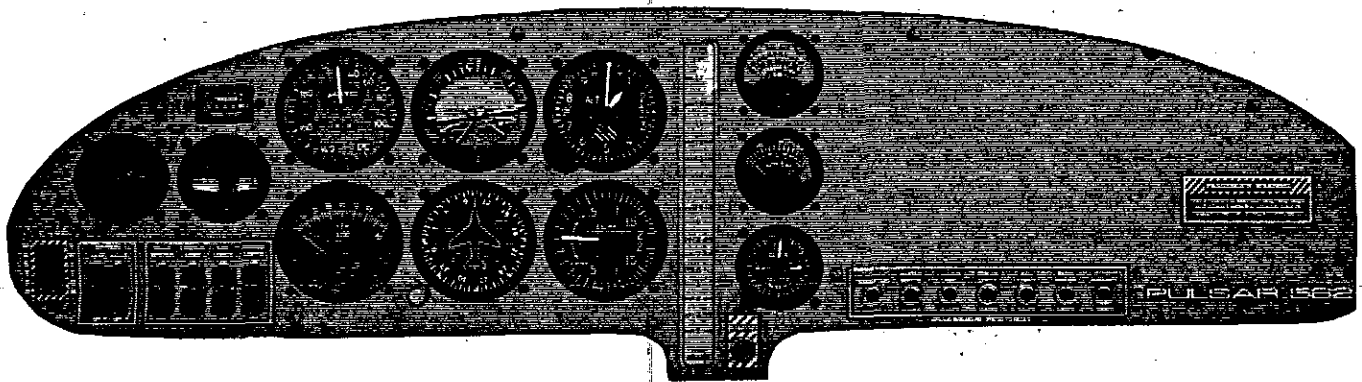
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November, 1992

## Instrument Panels for Pulsars

George Gennuso (Palmdale, CA): "I have enclosed a picture of my completed instrument panel which is made of 3/16th inch aluminum and is all one piece. The sight gage is covered by a flush mounted 1/8th inch thick piece of plexiglass. The plexiglass is divided into one gallon increments with the sight tube behind it. Behind the sight tube is a channel for the tube painted day glow yellow to increase the visibility of the fuel level. In the picture the tube is not shown, but I think you get the idea.

All of the lines, boxes, lettering and the Pulsar 582 logo were created on a PC using Correll Draw. They were printed on a laser printer and that, in turn, was turned into a color transfer. The transfers were then rubbed on the painted instrument panel to make them permanent. I got the idea from a reprint in one of our EAA chapter newsletters. I have enclosed a copy of the procedure if you would like to share it with the other Pulsar builders (see below)".



Do Your Own Custom Panel Lettering  
by Patrick Fanning  
EAA Chapter 448

When I got my 1955 Tripacer in 1989, the instrument panel was composed of seven different pieces of aluminum, pop-riveted and machine-screwed together. Previous owners had moved, replaced and added instruments over the years, and the result was an unsightly hodgepodge with flight, engine and navigation readouts scrambled together in a way that defied an orderly scan.

Since I had to replace a dead navcom and directional gyro anyway, I decided to rearrange the left two-thirds of the panel. When I was done, I had an almost standard grouping of flight instruments in front of the pilot's seat, the new radio in the middle, and everything securely mounted on a new aluminum panel. I scuffed the aluminum and spray-painted the old and new panel sections with Randolph's "instrument panel dull black".

I wanted all the panel markings and placards to look like they had been printed or silk-screened on the panel at the factory. I knew from experience that I couldn't get the "rub-on" letters from the art supply store perfectly straight and evenly spaced, especially when lettering the parts of the panel that I couldn't remove from the plane to work on. I talked to a printer and a graphics designer about my options. After some experimentation, here's the method I came up with:

Make a tissue paper tracing of your instrument panel, exactly locating all instruments and switches. Then pencil in your call sign, switch IDs, warning placard statements, "NO SMOKING" signs, and so on. Experiment with the placement, size, and spacing of the information until you're satisfied.

Take your tissue paper to a computer nut who is into desktop publishing. For both Apple and IBM type computers, there are programs that allow you to set professional-looking type on a home computer, then printing it out in crisp black on white on a laserprinter. If you don't have access to a laserprinter, most large copy shops have them these days. (Ed. note: Copy shops with "rental computers" are becoming quite common throughout the U.S. You can "rent" time on them in the store for \$2-\$3 per 15 minute increments). You can also go to a regular typesetter who will charge you about \$35 for a panel's worth of type.

There are two advantages to having your own type set. First, you are not limited to the sizes and styles of lettering that are available as "run-on" letters at the art supply store. You can exactly match the factory typefaces originally used on your airplane or use any style that pleases you. You can fiddle with the line length and type size until everything is perfectly spaced and looks just right. The second advantage is that all the lettering will be perfectly spaced, perfectly straight, and will stay that way.

All the lettering for the average panel will fit on one 8.5" x 11" sheet of paper. Make a photocopy of the piece of paper, cut it up, and lay the markings out on your tissue paper panel to make sure everything fits and looks good.

Take the original black-on-white to a large art supply store or graphic arts photo studio that can make "color transfers". Color transfers are custom-made run-on letters, shapes and illustrations that graphic designers use to make mock-ups of ads, packaging designs, book covers, and so on. If you have trouble finding a source of supply, call some local graphic designers and ask where they get their color transfers made.

The color transfers will be a "rub-on" version of your type, exactly as it appears on your original, and can be made in nearly any color you want. Also, you aren't limited to mere letters and numbers. Any black and white image that can be photographed--logos, diagrams, drawings--can be made into a color transfer along with your type. It takes a day or two and will cost about \$25 for an 8.5" x 11" original. While you're at the art supply store, pick up a burnishing tool for rubbing down the letters and a spray can of matte artists' fixative.

Treat your color transfer gently. Keep it dry and cool. Leave the sheet of backing paper behind it at all times and don't put anything heavy on top of it. Those little letters are sticky on the down side and want to adhere to anything they touch. That's good because it means you can use color transfers to letter bare metal, painted surfaces, wood or plastic.

Cut the color transfer into the individual words or paragraphs that you want to transfer to your panel. Make sure the panel surface is clean and dry. If it's very slick, dull it a little with 0000 steel wool or a plastic scuff pad. In awkward places, you might want to use a strip of masking tape below where you want the words as a guide to keep the lettering level. Short words and letters can be placed by eye.

Put the transfer against the panel where you want it. For big pieces you might want to tape one edge in place to hold everything in alignment. Now just rub over each word with a dull pencil or a burnishing tool. Carefully peel the transfer material away, making sure that each letter adheres properly. Put a piece of the non-stick backing paper over the letters and give them a final rub to make sure everything is flat.

The transfer lettering will cure over time like paint, becoming tougher and sticking tighter. To give it added protection from scuffs and scratches, spray on a light coat of satin polyurethane or matte artists fixative (also available from the art store). I've used both and there doesn't appear to be any compatibility problems between the transfers and the clear coatings. If the clear coating makes your panel too shiny for your taste, dull it carefully with a plastic scuff pad.

### Update on transfer process from George Gennuso:

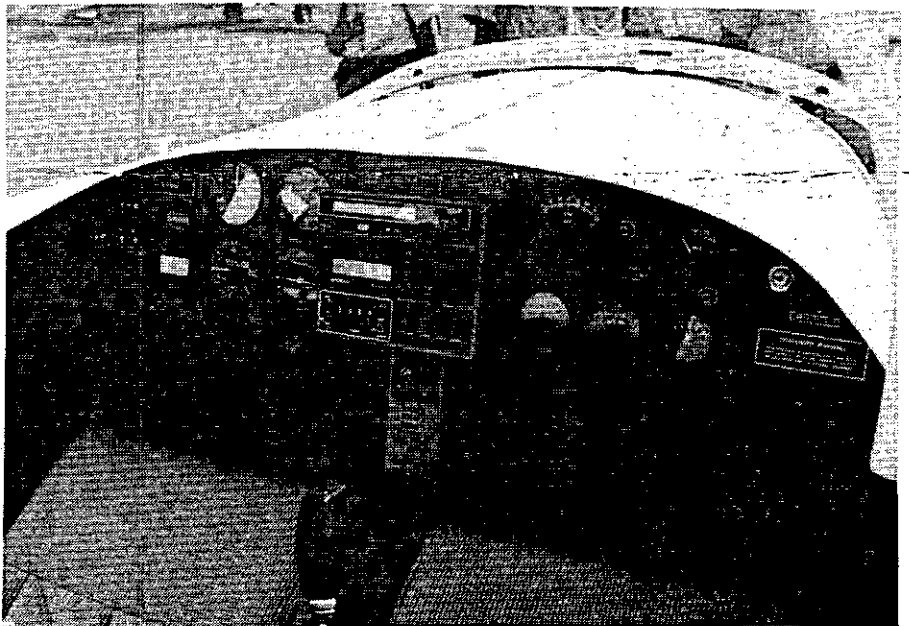
George talked to me recently about the process described above and had a couple of important suggestions:

- Be sure to use "clear" coating when you spray over the lettering. Some sprays have a yellowish tint to them. Spray some on a clean white piece of paper and let dry to confirm the color.
- Before putting the lettering on the panel, use 600 grit wet sandpaper on the panel surface to make the clear coat adhere better. This is important for anyone using a metal instrument panel.

### Instrument panels from other Pulsar builders:

#### Pat Keesler (Appleton, WI)

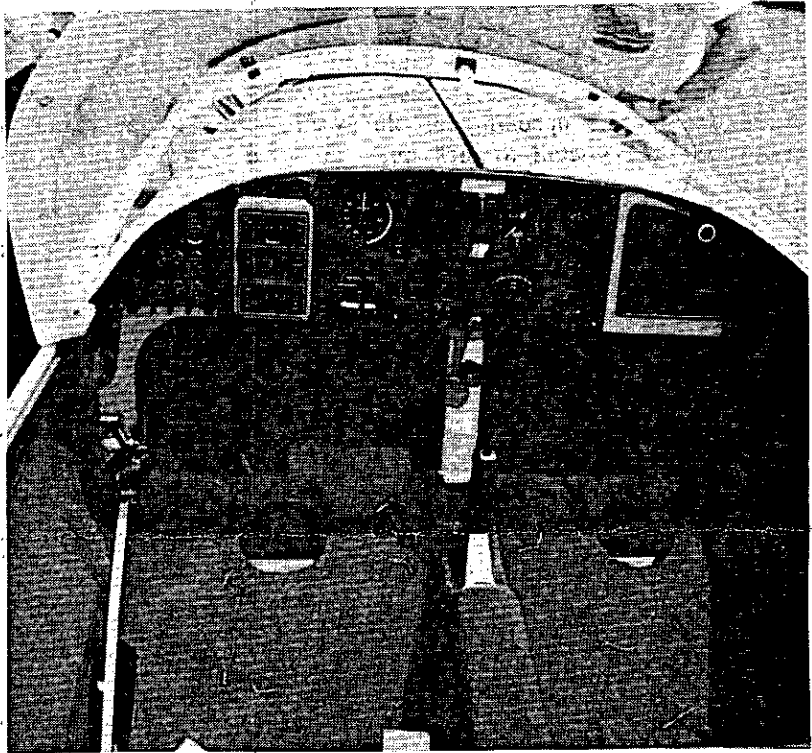
Pat's instrument panel follows standard Pulsar construction techniques with a modification of the center section and use of a fuel gage in lieu of the sight gage. To the left of the radio stack is the switch panel, compass, airspeed ind., VSI, alt., and turn/bank ind. Instruments to the right of the stack are standard with the addition of the Skysport fuel gage. Pat's stack is comprised of a King com radio, Apollo Ioran, Terra transponder and fuse panel. Due to the lack of depth behind the panel, the stack is a couple of



inches forward of the panel. Pat made the frame of the extension with balsa wood from a local hobby store.

Lavern Lawrence (Loco, OK):

Lavern's Pulsar compresses instrument lay-out to fit a larger storage shelf in the right side of the panel. From left to right are the switch panel, radio stack, airspeed ind., VSI/turn/bank ind., compass, VOR ind., alt. ind., tach, and standard engine instruments. The fuel sight gage is center-mounted and follows standard Pulsar design.



Pulsars for sale:

• Gary Polizzotto--"Since I've done every possible change to a Pulsar short of making it a turbo-prop, I'm forced to do the following: For Sale--1992 Pulsar S.W. (short wing). Cover photo and article in 9/92 KITPLANES. Many extras including pearlescent paint. Cruise 135-140mph using 582. Top speed 158mph. 70 hours TTAE, all restrictions flown off. I love the plane, but I'm a builder so I'm off to my next project. \$27,500. Call for info. or magazine copy. Home 404-634-7811 Work 404-523-7684.

• 1/2 share in Pulsar XP (G-OOXP). Based in Northhamptonshire, England with private strip and hangarage/insurance. Best offer over L10,000.00 secures. Details from Geoff Webb 0536-513501

From The Factory

Congratulations are due to six new Pulsar builders this time: Barry Edwards (Devon, England), Ken McWhinney (N. Ireland), Bob Vaughn (Red Bluff, California), Emil Horoscak (Czechoslovakia), John Bentley (Meridian, Idaho), and Gwynne Griffith (Llanfairfechan Gwynedd, England). I have to say I'm still just as excited about each new Pulsar as I was the first one. (Except for mine of course). Congratulations guys! I understand the accomplishment and I'm impressed!

In the last newsletter we mentioned that some of the brake bands sent out with the Pulsar kits were too short. If yours doesn't "measure up" we will replace them. However, a few builders have become discouraged about the band brakes altogether. Let me encourage you that if you get the right bands, set them up to provide maximum contact on the drum, and grease the brake cables inside the cable housing, then the band brakes work every bit as good as a hydraulic disk brake that costs ten times the price. My brakes will hold the Pulsar for full power static run-up since I

I'm confident that you'll appreciate the simplicity and function of the brakes as much as I do. And don't let the upcoming article in *Air Progress* discourage you on the brakes. They were just trying to find a detail to pick on.

We've received another report of a Pulsar pilot discovering loose prop bolts during a routine inspection. Please be careful to check your prop bolt torque frequently during the first few hours of operation and at least every 25 hours thereafter; especially if the humidity is low. Loose prop bolts will shear due to fatigue in just a few hours if they have to take the full torque spikes from the engine. The load should transfer through clamp-up friction between the prop hub and prop.

One of our builders has discovered that his airspeed indicator was off 30 mph! The only way to explain that much error is internal damage in shipping because all these instruments are FAA certified. The point is: that much error could be disastrous during a dive test. Therefore, be sure that you do some time/distance calibration of your airspeed indicator before you fly faster than 120 mph.

We noticed an article in *General Aviation News & Flyer* that talked about alcohol in auto fuel. It stated that the EPA has passed a regulation requiring that the gasoline sold in 39 cities across the U.S. must be "oxygenated" to reduce air pollution. One of the additives used to oxygenate the fuel is ethanol which is not allowed in aircraft engines. The alcohol attracts water that can settle out in the bottom of the fuel tank. The affected cities are:

- Boston-Lawrence-Salem
- Denver-Boulder
- Los Angeles-Anaheim-Riverside
- Philadelphia-Elmington-Trenton
- San Francisco-Oakland-San Jose
- Albuquerque
- Baltimore
- Colorage Springs
- El Paso
- Fresno
- Las Vegas
- Memphis
- Modesto
- Provo-Orem
- Reno
- San Diego
- Stockton
- Washington (DC)
- Fairbanks
- Klamath County (Oregon)
- Cleveland-Akron-Lorain
- Hartford-New Britain-Middletown
- New York-Northern New Jersey-Long Island
- Portland-Vancouver (Washington)
- Seattle-Tacoma
- Anchorage
- Chico
- Duluth
- Fort Collins-Loveland
- Greensboro-Winston-Salem-High Point
- Medford
- Minneapolis-St. Paul
- Phoenix
- Raleigh-Durham
- Sacramento
- Spokane
- Syracuse
- Missoula
- Grant's Pass

Rotax says that if you buy fuel in any of these areas, you must check each fuel purchase with a simple commercial alcohol tester. Water collection is not the only problem with the alcohol. The two cycle oil and fuel don't mix well in the presence of alcohol. Also, the jetting might be affected.

The final news is the good ol' phone company is changing our area code on November 1st. The new area code is 210. Our phone number will be the same.

Safe and happy building and flying.

## Miscellaneous

Bob Taylor recently visited me in sunny Arizona and brought a book along which he highly recommends to all Pulsar builders. Entitled "flight Testing Homebuilt Aircraft" by Vaughan Askue, this 177 page book covers all aspects of flight testing from system tests and taxi tests to first flight, envelope expansion and flight performance. The book does provide a detailed approach to the flight test program and may provide you with additional information on how you should approach this critical aspect of experimental aviation. I contacted Iowa State Press (publisher) and got a 10% discount off the \$19.95 price for any Pulsar builder. If you would like to receive a copy, send \$17.95 plus \$1.50 shipping (\$4.00 overseas) to PBA at the address below.

On a similar note, many Pulsar builders have decided to use the Skysport electric fuel gage instead of the sight tube in their Pulsar (myself included). We'll be contacting Skysport in the near future to see about a discount on their fuel gages for Pulsar builders. I'll keep you posted.

## Coming In Issue #20

We've received new builder information from Ken McWhinney and Gary Polizzotto which we'll include in the next issue. We'll also catch up on various information updates sent in by several of you (thanks).

I've also chosen Issue #20 to review/index the prior 19 issues of Pulsar News. As the number of newsletters has grown over the past 3+ years, it's more difficult to quickly locate that piece of information you were looking for (especially if your hands are covered with epoxy)! We will index the information contained in the first 20 issues by topic and by location (From The Factory, Builder Input). I think this will be of benefit to everyone (especially the new builders) and, as always, I welcome your input and suggestions.

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