

Hangar *Echoes*

Experimental Aircraft Association
Chapter 168 Dallas, Texas

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Electronic Ignition Comes of Age

General aviation technology takes a needed step forward with the introduction of an aftermarket electronic ignition system for aircraft piston engines.

Late next year, when Lycoming-powered Model 172s start rolling out of Cessna's final assembly plant in Independence, KS, some will contend that much of the technology behind this "new" airplane is really pretty old. And they'll be right. The Skyhawks Cessna builds in 1996 will be largely unchanged from the light aircraft Cessna stopped building in 1986.

Most likely, however, the new Cessnas will incorporate at least one important feature missing from the previous generation of piston-powered airplanes: electronic ignition. Introduced in automobiles in the early 1970s, electronic ignition has not been widely used in general aviation recip engines, apart from some modified automotive systems that find their way into light experimental airplanes. But product liability reform legislation passed by the US Congress last year is breathing some new vigor into long dormant general aviation technology. As a result, electronic ignition systems will soon be sparking aircraft engines to life. In addition to the ignition system Lycoming is evaluating for its new IO-360 engine—which will power the resurrected Cessna 172—Unison Industries has developed an electronic ignition system for the general aviation aftermarket. The company expects to receive its first STC approval for the system this summer, paving the way for retrofit installations on Lycoming IO-320 engines. Known as LASAR (Limited Authority Spark Advance Regulator), the system uses a microprocessor-based ignition controller to regulate timing advance and spark energy to achieve proper combustion and better engine efficiency.

According to Brad Mottier, VP/Unison, LASAR system development started about two years ago, when product liability legislation "began to look like a reality." He notes that Unison first worked independently of the major engine manufacturers because of skepticism in many quarters that electronic ignition could significantly impact engine performance. "Initially, we went into development intending to figure out what actually happens to an aircraft piston engine when you start varying ignition timing angles and spark energy," says Mottier. "That really hadn't been done before."

Making converts

Mottier explains that Unison built a test system and conducted early evaluations on an engine dynamometer. The success of these tests led the company to demonstrate its preliminary system for Textron Lycoming and Teledyne Continental, where early skepticism was eventually replaced by genuine interest and additional test programs. The advantages of electronic ignition systems in automotive applications are well known. Such systems provide better starting in all weather conditions, smoother engine operation, improved fuel efficiency and reduced emissions. Unison says many of these same benefits can be achieved when an electronically controlled ignition system replaces a standard magneto system on an aircraft piston engine. Unison's LASAR system actually replaces those standard magnetos with new Slick 4300/6300-series magnetos and the microprocessor-based controller. It joins conventional magneto technology with electronic control. The Slick mags also provide a backup ignition source should the electronic controller or some other part of the system fail. That system redundancy is a key feature, says Mottier:

"Remember, the first two letters in LASAR stand for limited authority," he notes. "That limited authority allows the engine to operate according to its existing type certificate. In the event that you have an electronics failure, you revert to a standard magneto system. So you're not giving up anything. That's important, because our goal was to develop a system that would add to existing safety and features of the airplane, not detract from it.

The system can operate in either of two modes, explains Mottier: an automatic mode, in which the controller adjusts ignition timing and spark energy depending on engine operating conditions and throttle settings, or a backup mode, in which ignition timing and energy levels are constant. "The system runs in automatic unless it is switched manually to backup by the pilot or unless the microprocessor detects a problem and switches to backup," Mottier says. And electronic ignition makes for easier engine starts, says Mottier, because with the system's extremely accurate spark advance, the plugs spark at precisely the right point in relation to the position of the piston. In addition, the LASAR system can deliver about 340 percent more energy to start the engine than standard magnetos can deliver.

Improved timing accuracy

Conventional magnetos use one of two timing systems. One is an impulse coupling, a mechanical device that's reasonably accurate but is vulnerable to temperature extremes.

BOARD MEETING

ATTENDEES: Sam Cooper, Richard Robbins, Mel & Ann Asberry, Don Christiansen, Marvin Brott, Jerry Bidle, Jay Shear, Vern Williams, Clair Button, Brownie Seales, Cris Harrison, Earl Browning.

A quorum being present, the meeting was called to order by Sam Cooper, Pres. He made the following announcements:

The Nov. newsletter will be assembled at Tom & Bonnie Lewis's house.

The Nov. 11 fly-in will be at the McKinney airport.

The Nov. 16 board meeting will be at the library.

The Nov. 28 newsletter assembly will be at Don Christianson's.

The following **officers were elected** at the last meeting:

Pres.	Ann Asberry
V. Pres	Earl Browning
Treas.	Vern Williams
Sec.	Ralph Haroldson

A motion was made seconded and approved to continue our chapter \$1,000,000 **liability insurance** in 1996 at a cost of \$40.

Aircraft Spruce is planning a builder's conference in this area in Feb. '96.

The following options were considered for the **Chapter trailer**: Purchase one used from Uhaul. None available; Purchase a new 5X8 covered trailer for \$1039; Purchase a 1978 20' pop-up for \$1295; A pop-up advertised for \$900 was already sold; Fix the existing trailer top.

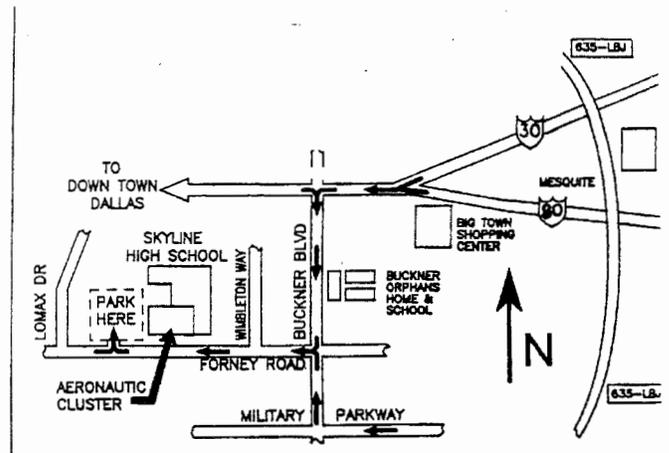
A motion was made, seconded and approved to spend a maximum of \$1000 on the existing or a new trailer.

The Nov. **door prize** will be the latest Bengalis book.

Ann Asberry is working on a team of journalists to assist the **Newsletter Editor** next year.

Methods for improving the newsletter were discussed.

The meeting was adjourned at 8:41.



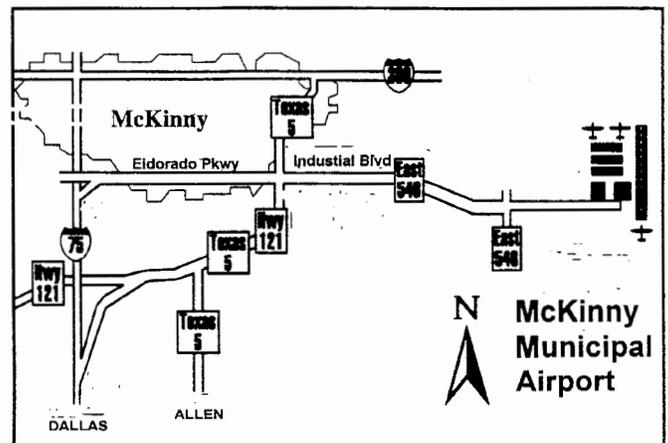
Calendar of Events

November 7: Regular Meeting at Skyline High School
Library 6:30 pm - 8:45 pm. Come view the training tools of an aviation magnet program.

November 11: Fly-in at McKinney Municipal Airport
10am - 2pm, hot dog lunch, joint event with TI Flying Club

November 16: Director's Meeting at Farmers Branch
ske Library 7:00 pm - 8:45 pm.

November 28: Hangar Echoes Assembly starting at 7:00pm.
hosted by: Linda and Don Christiansen,
515 Softwood Cirlee, Duncanville, 298-6531



The President's Letter

During the October Meeting, we held our 1996 Chapter Officer elections. The nominees were all very capable, and I want to thank them for volunteering to run for office. I know that our new officers will be able to guide Chapter 168 very capably through 1996. The new officers are listed elsewhere in this issue. I would also like to thank my fellow Board members who assisted me in locating nominees for our 1996 elections.

The October 7th Chapter Fly-in was held in some of the excellent flying weather we have been blessed with this month. We enjoyed a friendly Chapter event to which about a dozen aircraft flew in. I want to thank Jayme and Richard Robbins for hosting the Fly-in at Mesquite's Hudson Municipal airport.

The Chapter Board is continuing to work on our Chapter Trailer situation. Our current plan of action is to generate a design of the proposed new top for the trailer, approve it, and then to fabricate a new top. After reviewing our options for either replacing the top or the trailer, it was obvious that fabricating a new top would be our least costly approach.

A couple of weeks ago, right after the EAA Copperstate Fly-in, I received a telephone call from Europa Aviation. They were planning on stopping in Dallas on the way back from Copperstate in the Europa, and wanted to know if I knew any members who wanted to see the aircraft. I quickly checked our Chapter roster, but did not see anyone listing a Europa. But, one of our recent visitors had expressed such an interest. He was able to see and fly the Europa the following day.

In the course of reviewing the Chapter roster, it was plainly evident from my personal knowledge that a number of the aircraft or interests listed were no longer current. The problem here is that this makes it harder for others to properly identify those who can either help someone or benefit from something. So, my point here is to please keep your aircraft projects and interests in the Chapter roster updated. You never know when something good will come of it.

Finally, Aircraft Spruce and Specialty Co. is again working on organizing an Aircraft Builders Conference (ABC) in the Dallas area for late February 1996. As many of you may recall, the last ABC held here about two years ago was very successful. They will need volunteers to help with the event, and I am sure that a number of Chapter 168 members can step forward to help pass along their knowledge to others. I will keep the membership posted on the status of this event.

I want to thank Don Christiansen for donating a ride in his RV-4 as our October Door Prize. The winner, an RV builder no less, got to enjoy his RV ride during our October Fly-in. His grin afterwards said it all. In addition, John Ivy contributed two tickets to the Alliance Airshow as Door Prize drawings also.

Let's keep building and restoring, so we can keep them, and us, flying.

- Sam Cooper

New Chapter Videos Available

Several additional videos have just been added to our Chapter 168 collection. These videos can be borrowed from our Chapter Librarian, Ernie Ludwick, for viewing by Chapter members. Europa Aviation Inc. has donated a copy of their promotional video, "Europa: Better by Design", to the Chapter. This is a professionally done promotional video of the Europa aircraft, which is designed and kitted in the United Kingdom. Fighter Escort Wings has donated a copy of their promotional video on the F.E.W. P-51D 2/3 scale replica aircraft to the Chapter. This video is primarily a documentary of design and development of this replica aircraft. It provides insight into the man-years of effort that go into creating a modern, kit-built aircraft. Finally, a video of the 1995 Oshkosh approach procedures, produced by the FAA, has been added to the library as well.

1996 Officers Elected

The 1996 Officer Elections were held during the October Meeting. The Chapter 168 1996 Officers are as follows:

President: Ann Asberry

Vice President: Earl Browning

Treasurer: Vern Williams

Secretary: Ralph Haroldson

The new Officers will take office on January 1st.

October Fly-in

A very pleasant day brought a number of aircraft out for our monthly Chapter 168 Fly-in at Mesquite's Hudson Municipal Airport. The following aircraft flew in: Flybaby; Mini 500; Mustang II; RV-6; two RV-4s; Luscombe 8E; Bonanza; Cessna 172; Cessna 182; Cessna 206; and a Navion. The Mini 500 was quite a treat. It was a nicely finished example of a well designed kit. The pilot demonstrated its impressive flight capabilities on departure. In addition, it was very quiet.

Continued from page 1

Timing accuracy can "drift" with an impulse coupling, says Mottier. The other is a so called shower-of-sparks system that delivers a low-energy spark timed with the opening of a set of contact breaker points. The shower-of-sparks system depends on a good battery and properly set points. "With the LASAR, whether it's replacing a shower-of-sparks or an impulse coupling, timing accuracy is much better," says Mottier. "And the energy that's delivered to the plug is more than three times as powerful, so if you have a partially fouled plug or if your fuel/air mixture isn't quite right, there's a lot more spark to get the engine started." He adds that the LASAR's controller is designed to compensate for variations in magneto Output caused by temperature extremes. In addition to providing more precise timing at engine startup, the LASAR electronic ignition is also designed to vary the timing during operation. The timing angle on a magneto is typically set at 25 degrees, which is about the Optimum setting when the engine is operating at maximum power at sea level. When the aircraft is operating at a lower power setting, as it taxis for example, a different timing angle would be more appropriate. But magnetos are set for a constant spark advance, which is practically never exactly right. The LASAR system doesn't have that restriction. It can vary the timing angle anywhere between 10 and 50 degrees, depending on engine RPM and manifold pressure. The result, says Mottier, is smoother engine operation at virtually any power setting.

Another result is reduced fuel burn. When Unison tested the LASAR system on a Lycoming I0-360A engine in a dynamometer cell, "we saw improvements of 10 to 12 percent in brake fuel specifics [at cruise settings]," says Dean Mechlowitz, the company's OEM account manager and liaison with engine manufacturers. He says the LASAR system can almost certainly offer improved brake fuel specifics in many applications, though the exact benefits would depend on the aircraft installation. For example, he says, when the LASAR system was tested on an I0-320 engine in a test cell, fuel savings "varied between five and 12 percent," depending on power settings.

Lower exhaust temperatures

In addition, says Mechlowitz, dynamometer testing also indicates that the LASAR system can contribute to lower engine exhaust gas temperatures. He notes that EGT reductions of 50 to 150 degrees F (10 to 65 degrees C), depending on engine model, have been recorded. Mottier says that many pilots anticipate greater engine power when they hear about the LASAR's impact on engine performance. But pilots are not likely to notice a big power boost with the LASAR system. Rather, they'll probably see reduced fuel burn when they operate at the same throttle and mixture settings they normally do. At this writing, Unison is pursuing an STC approving LASAR installations on I0-320 engines. At press time, the company anticipated having that STC by the end of July. An airframe STC for installation on a Cessna 172 is also planned.

Of course, Mottier and Unison would also like their electronic ignition system approved by an engine OEM, perhaps even as original equipment on those new Skyhawks Cessna will soon be building. But he emphasizes that the LASAR system was conceived and developed primarily as an aftermarket product.

"That's where the numbers are," he says. "But more important, that's where the product can have the greatest impact on improving the state of general aviation technology."

Paul Berner - Senior Contributing Editor

AVIATION Equipment Maintenance Aug 1995

Steve and Paula Wittman perish in crash.

Stevenson, Alabama - Famed air racer and plane designer Sylvester J. (Steve) Wittman and his wife, Paula, were killed Thursday, April 27, as they flew from their winter home in Ocala, Florida, to their home in Oshkosh, Wisconsin.

The couple were flying in an airplane designed and built by Wittman, the 0 and 0 Special, a single-engine, high-wing, side-by-side, expanded version of the well-known Wittman Tailwind. They departed Ocala at 9:30 a.m. Central Daylight Time, planning to arrive in Oshkosh around 3:30 p.m. after a non-stop flight. When they failed to arrive that night a search was initiated.

EAA Founder Paul Poberezny told GANews & Flyer it appeared the airplane came apart in flight. The wreckage was strewn over a three- or four-mile area northeast of the town of Stevenson. The site is about 40 to 50 miles from Chattanooga on the 240 to 250 radial. Poberezny said the plane was found in heavily wooded, hilly terrain.

Wittman, 91, apparently was thrown from the airplane while it was still in the air. His wife, 56, was found in the remains of the fuselage. The wings and tail sections had separated.

Parts of the steel-tube-and-fabric airplane were found in the trees as Alabama State Troopers investigated more than 20 reports of an aircraft in distress. Some of the reports indicated they had heard what sounded like an explosion. Weather along the route of flight and at the accident scene was good, according to reports. - **Dave Sclair** - *General Aviation News & Flyer* - May 12, 1995

Flying M Ranch Fly-in/Campout

The 1995 Flying M Ranch Fly-in/Campout was held on October 27-29 in the Piney Woods of East Texas near Reklaw. The beautifully clear and comfortable weather brought a number of other aviators to converge on this small grass strip. There were probably 200-300 aircraft attending the event, and at least a 1000 people there on Saturday. This grassroots flying event has been growing more popular each year as more people come to enjoy the relaxed atmosphere of a simple flying event. There is no fancy airshow, and little formal programs to speak of. Just a chance to sit back, talk airplanes, and soak up the atmosphere in a crowd of aviation minded individuals. A number of people fly in and camp out for the weekend. Enjoying the cool October temperatures and fresh air of the East Texas Piney Woods. They just park along one side of the grassy strip up next to the pines, and set up their tents. Fellow Chapter 168 member Tom Moe and I flew Tom's Cessna 182 into the field for the fun on Saturday. Since the roughly 3000' grass strip is surrounded by 60'+ tall pine trees, we got to exercise the 182's obstacle clearance abilities. We had plenty of margin, but this was not something most of us in the Dallas area have to do very often. The smoothly rolling undulations of the runway just added more flavor to the landing. A favorite activity of many was watching the many arrivals and departures. The Flying M Ranch Fly-in/Campout is usually held the weekend after Kerrville. Having experienced the event first hand, I can safely say that it was as much fun as my fellow Chapter members said it would be. Consider putting it on your calendar to 1996. - **Sam Cooper**

1995 EAA Southwest Regional Fly-in at Kerrville

The 1995 EAA Southwest Regional Fly-in at Kerrville, TX on October 20-22, was held under clear skies. The excellent weather resulted in the best turnout of aircraft and visitors since the event was moved to October. Consequently, we were very busy on Saturday marshaling and parking aircraft. The experimental aircraft area had no more than six spots left, and the Antiques and Classics went all the way up to the Ultralight/Rotorcraft area. There were a lot of planes to see and admire. Two Chapter 168 members also picked up awards for their aircraft. Weldon Yokochi was awarded Best Rotorcraft for his custom designed and built gyroplane. His polished aluminum, Subaru powered gyro is a sight to behold. Don Stovall received the Plans Built Custom Outstanding Workmanship award for his Mustang II. Congratulations gentleman. Don completed the aircraft in about 1988, but had never bothered to have it judged, since it was not built as a show plane. Some fellow Chapter members finally convinced him to have it judged, since the quality of construction was plainly evident to them. The look of astonishment on his face at the Saturday awards banquet was one the rest of us at the table will long cherish. As the organizer of the Chapter 168 Flight Line Operations effort, I want to thank the following Chapter 168 volunteers who made it possible to marshal and park as many aircraft as we did: Ann Asberry; Mel Asberry; Owen Bruce; Chuck Farry; Art Lombas; Jay Shannon; and Don Stovall. In particular, Ann and Chuck spent and enjoyed many hours directing traffic, and Mel took charge of our critical Saturday afternoon departure operation. Your volunteer efforts helped make the marshaling and parking run smoothly.

Thanks. - Sam Cooper

FIBERGLAS WING TIPS

Last year I decided that I would make my own wing tips rather than buy them. I offer the following procedure and advice that may be of help to anyone else that wants to try making their own wing tips:

1. Don't.
2. Reread item 1.
3. If you are stubborn enough to ignore item one, the wooden forming blocks that were used to make aluminum ribs are exactly the right size to use as a guide to make the foam forms that you will need to make the wing tips. If you did not make aluminum ribs you will not have these forming blocks and will have to plot the airfoil onto a piece of paper and use it as a guide to make the wing tip forms.
4. I used styrene that I got from the lumber yard as the material to make the foam forms. I found out later that this is the worst choice of the three available foams: styrofoam, urethane, and styrene. Styrene is the white stuff that they make cheap drink coolers out of that looks like it is made from little balls. Styrofoam is the blue stuff that is sometimes used for insulation. Only styrofoam can be cut using the hot wire method. Urethane is white and impervious to gasoline. Styrene and styrofoam both melt if any petroleum distillate touches either one of them. This means that they cannot be used to make polyester Fiberglass parts, only epoxy parts. This incompatibility is a good characteristic in the case of styrofoam since you can make the mold, lay Fiberglass and epoxy over it, and then when it cures, pour gasoline or some less dangerous solvent into the mold and the mold will melt

leaving only the Fiberglass part and any plaster that was used for final smoothing. Styrene melts but it makes this goo that is a real mess. I would recommend that you use urethane.

5. You will have to glue several layers of foam together to make a blank that is thick enough to create the male form for a wing tip. DO NOT put any glue near the edges of each layer. The glue is harder than the foam and it is almost impossible to sand smooth since the foam is eaten away on both sides of the glue joint more easily.

6. Rough cut the forms on a bandsaw. Using the rib forming block as a guide, perform the rough smoothing using a rasp or Sureform tool followed by a file or sandpaper. You will need to wear a good quality dust mask while you are doing this since this stuff is deadly to your lungs.

7. Coat the forms with wallboard joint compound and then sand smooth. I like the powder since you can mix up only what you need at the density that you want. I found that the density of stiff cake frosting works the best. I tried using Plaster of Paris at first and it is worthless. Plaster gets very hard and additional layers will not always bond well.

It will probably take more than one coat to get it smooth. It is best to attach the foam to the wood forming blocks while you are doing this to assure that the edges will mate with the wings. Apply the final coat dragging a squeegee along the side of the wing tip forms with

the edge of the squeegee dragging on the wooden forming blocks. This is important since it will guarantee that the completed wing tips mate with the wings.

Sand and file always in the LONG direction to get a smooth surface.

8. When you are through coat the forms with paint. The only paint that will work on styrene or styrofoam is water-based latex or water-based varnish. (Try it on a scrap first to save yourself some heartache.)

9. Wax the form three times with car wax to make the release easier... hmmm, make that "to make the release possible. It is anything but easy.

10. Order three yards of unidirectional fabric and one and one half yards of bi-directional fabric. You will also need a yard or two of pull ply (more on that latter).

I used one of the cheaper epoxies. The only difference is that cheaper ones take forever to completely cure so you won't be able to use the wing tips for some time (which in my case is not a problem) and cheaper ones also contain more of the deadly chemicals that can cause skin reactions. I ordered a couple of pumps for the epoxy and I strongly recommend it.

11. Cut out everything and get it all ready to go and buy your family a weekend away from the home so you will not get any interruptions. The unidirectional fabric should be cut on a 45 degree bias to the length of the forms (one layer with a 45 degree bias one way and other one with the 45 degree bias the other way). The bi-directional fabric should be cut with the thread running across the form. You will need to fabricate a makeshift beam balance to weigh out the epoxy. I fabricated one from a piece of 1 inch square wood about r~five feet long, some string, and a couple of small plastic buckets that the joint compound came in. I was amazed at how sensitive it was. A couple of drops of water would send it to full-scale deflection.

12. Get some large zip-lock freezer bags and put one in each of the two balance buckets. Put one of the unidirectional Fiberglass layers in one of the buckets (the two unidirectional layers go on the form first followed by the bi-directional layer). You will "astutely" notice that the scale deflects. Open up the zip-lock bag on the other end of the scale and pump in enough epoxy

Continued next page

and hardener to exactly balance the scale. This is where the pumps really come in handy since they let you measure out the exact amount needed.

13. Close the zip-lock bag and knead the resin and hardener for about three minutes to be sure that it is properly mixed.

14. Open the zip-lock bag and stuff in the first layer of Fiberglas cloth. Knead it until all of the white areas are gone.

15. Open the zip-lock bag and transfer the first layer to the form, spreading it by hand. CAUTION: This stuff is real nasty, BE SURE that you are wearing eye protection (one drop can blind you!!!), chemical gloves, an organic rated chemical breathing mask, and clothing that covers every square centimeter of skin. (Now, repeat after me... call 911 if you have a problem... call 911 if you have a problem.) I found covering neoprene gloves with latex surgical gloves to be best since when you are through they can be peeled off leaving your gloves clean.

16. Smooth the cloth and repeat the above steps for the other two layers.

17. Put strips of pull ply across the form and smooth it down with a squeegee.

18. Let the lay-up dry for a couple of hours and then trim with scissors. You will want to wipe the scissors with a cloth moistened with alcohol. If you don't do this, you just wasted a pair of scissors.

19. After the assembly has dried overnight, pull the pull ply (this is the fun part). You will be amazed at how smooth it is.

20. Mix up some more epoxy mixed with micro balloons until it is the consistency of stiff cake frosting and squeegee on a smoothing coat and let it dry overnight.

21. Repeat step 20 until smooth.

22. Prime with filler primer and sand with 220.

23. Fill in any small imperfections with spot putty and reprime and sand with 320.

24. Reprime with ULTRAVIOLET PRIMER. (You don't have to do this step if you don't mind making new wing tips every few years since the sun will destroy them if you don't.)

A one-step procedure would be to mail in an order for wing tips for your kit. If you make your own you will spend about three times the amount of money that it would cost you to buy them, but you get the joy of making your own which is one of the things that homebuilding is all about. The neat thing about this is that it only took me one afternoon to complete them.. NOT!!! - *Gene Cook - Wing Tips - EAA Chap 12 - Oct 1995*

Editors Corner

Well here we are again, at the wire. Thanks to faye Troxel for proofreading this issue. Again I will call for writers to step forward. Please let me know of completions before they happen that way I can get some good B&W photos. Please feel free to call me (620-2486), with your suggestions, late braking news, or other aviation news, or if you just want to talk.

This month as you can see the newsletter was printed on a HP lazer printer, at the printer.

Circulation: 250 copies printed.

Equipment used: 386DX40 w/4Mb RAM, Sharp JX-450 Color Scammer, Windows 3.1, Ventura Publisher 4.0, Micrografix Picture Publisher, Freeze Frame (Graphics Conversion), Omipage (OCR).

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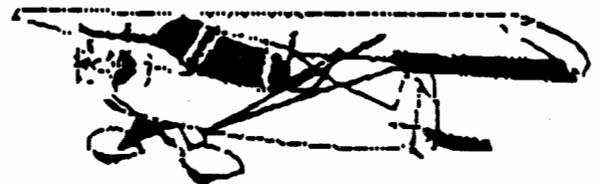
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Classifieds

Aviation ads can be placed by Chapter 168 members free of charge.

Panes

Sonerai II - Low wing taildragger, 2 place. On Gear. Have all parts to complete, including wing modification, 2180cc VW (Monnett conversion) 0 hrs. \$4,000 - Gene 424-9880

Christavia MKI. 285 hrs TT. Lyc IO-235, 180 hp rebuilt by certified shop. Prop is yellow tagged Sensenich. All elect equip was purchased new; Val 760 Com, Flybuddy Loran, NARCO AR-850 encoder, starter. Aircraft located at Clover Field south of Houston Hobby. Can send photo. \$16,000 - Mike Burkhalter (713)996-7931

Appcee w/ Doyn Geronimo Conventon. 4100 hr TT and 700hr 180 hp engines with fresh anual. \$38,500 - Bob at Lancaster Airport

Parts and Things

Carburetor, MA3A. P/N 10-3103 yellow tag - venturi and metal float, AD c/w by J&G Carburetor in July 94. \$700 (no exchange) - Earl Browning 684-7670

Cassutt Project (older). 100hp Contental. 90% complete. \$3500 - Jim Wilson 529-1814

Cylinders, Continental 0200/300. Chromed, less rocker ams and valve covers. \$70 ea. - Philip Welsch 423-2636

Fuel Trailer, 38 Gal. Welded Aluminum Tank, 13gpm 12volt pump, room for storage, service station type nozzle. \$550 - Mel Asberry 517-5070

Propeller - Hartzell HC-C2YK-IB. (Lycoming IO-360) Minnor tip damage. \$750 - Jim Wilson 529-1814

Propeller - McCauley Met-L-Prop DM 7651. 74" 8 bolt Continental 0-300A. - Philip Welsch 423-2636

Real Estate

Lot in Horseshoe Bend Air Park (South of Weatherford). Lets make a deal. \$4,000 - Jim Mahoney, Ste, 636, POB 917729, Longwood FL 32791, (813) 647-7044

Want To Buy

Parts for Starduster II project: ailerons, elevators, rudder, fuel tank, engine mounts. New or Used. - Hernan Matos, POB 37441, Airport Station, San Juan, Puerto Rico 00937-0441

EAA Chapter 168 Officers

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Secretary	Ralph Haroldson	358-3710
Treasurer	Jerry Bidle	517-0946
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		FAX 620-2487

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EAA Dallas Chapter 168
POB 168
Addison, TX 75001-0168

EAA Dallas Chapter 168 Membership Application & Renewal Form

Please print clearly

Application Status: New member: _____ Renewal: _____ Info. change: _____

Membership dues for EAA Dallas Chapter 168 are \$15 for one year. Nametags available for \$6.

Make checks payable to: EAA Dallas Chapter 168.

Name : _____ (_____)
Preferred name

Co-Pilot : _____ (Spouse, Friend, other)

Addr. 1 : _____ (or Business Name)

Addr. 2 : _____

City : _____ St: _____ Zip: _____ Mapsco # : _____

Phone: H (_____) _____ - _____ W (_____) _____ - _____ EAA # : _____

Pilot/A&P ratings: _____

EAA Office (past or present) or other additional note:

Notes: _____

Notes: _____

I am interested in helping with: Fly-ins _____ Programs _____ Newsletter _____ Officer Positions _____

Plane/Project/Interest Example: Acro Sport II (Fly)% RV-6A (20)% Velocity (Int)%

_____ (_____)% _____ (_____)%

Mail applications to: EAA Dallas Chapter 168, P.O. Box 168, Addison, TX 75001-0168