



The Flightline

EAA Chapter 958 San Marcos, TX
Where every day is a good flying day!

June 2014 Issue

Experimental Aviation



The Success Continues...

EAA Chapter 958



The Leader In Recreational Aviation

	Page
Meeting Notice	1
Prez Sez	1 & 2
Editors Notes	2
Gas Welding	3 - 7
Wanted for Website	7
Quicksilver L-SLA	8
Sunseeker Duo	8
EAA/Foreflight	9
Scholarships	

June Chapter Meeting at Redbird Skyport in San Marcos

Chapter 958 will be meeting Saturday 6/21 at 10:00 a.m. in the conference room at Redbird Skyport preceded by a pancake breakfast at 9:00 am

**Program: EAA Technical Advisor - How Tech Advisors can help members
by: Steve Dixon**

NEW CHAPTER WEBSITE: www.958.eaachapter.org

Prez Sez

Hi All

The chapter has under gone a number of changes over the last few months. The officers have worked very hard to insure that as a chapter we are current and in compliance with EAA headquarters. We have worked to make sure we have updated all of our chapter material so it reflects the move to San Marcos. We are making great progress and should have most all matters completed soon. I personally express thanks to the officers for there insight and hard work. A big Thank you to Stanley Timmerman who has put together the web page. the chapter will be replacing member name tags soon so please ensure your membership is current. We will inform members via newsletter when these will be available. Along with this we now have a new technical counselor Mr. James "Steve" Dixon. Thanks to him for stepping up to fill a much needed position. It was brought to my attention this week that the mailing address for the membership forms was not correct. The form was returned by the postal service to the sender. The address is as follows:

Barry Genaske
24245 Wilderness Oak, Unit 102
San Antonio, TX. 78258

The chapter meeting this month will start around 09:00 hrs. We will be serving a pancake breakfast to all members. Then into the conference room for the Chapter Program by Mr Steve Dixon followed by the EAA chapter gram time permitting. The meeting is more social this month and we encourage you all to invite anyone with an interest of aviation. We may need some help with set up, cooking, and clean up

after so if you can spare a few minutes before or after it will be appreciated. EAA also contacted the chapter about hosting the Ford Tri-Motor aircraft some time this fall. I should have more information by meeting on the dates they plan to be in the area. I will keep everyone posted on development's as they present themselves. Come on out and have breakfast and enjoy the company. Hope to see all on the twenty first.

Phill Steele

From the Editor

Wow! What a great month for EAA Chapter 958. We've officially moved to new digs at Redbird Skyport, we have a new Technical Advisor in Steve Dixon, we're having our first pancake breakfast in a long time, the EAA Ford Trimotor may be coming to San Marcos and we're getting a new web presence thanks to the hard work of Stan Timmerman. The new website is www.958.eaachapter.org. Also see page 7, Stan is looking for info on local suppliers of materials, hangers etc. that can be used in homebuilt construction. This will be published on the website to aid local members. The chapter would also like to extend a warm welcome to all new members to the chapter this month.



John Koenreich welcomes Chapter 958 to Redbird while Phillip looks on

Last month we did a presentation on waterborn finishes and viewed The EAA Chaptergram. Mr John Koenreich - General Manager of Redbird Skyport gave a welcome to the Chapter in its new location. John and the folks at Redbird have been extremely helpful with everything and want to help in any of the aviation activities we may have planned. He was very excited to hear that the Trimotor might be coming to San Marcos. If you see him in the facility be sure to thank him for the opportunity to be at Redbird and for their support. By the way if you fuel up at Redbird let them know you are an EAA member and you'll receive an \$0.18 per gallon discount.

This scribe would also like to thank Mr Steve Dixon who recently came to San Marcos to evaluate a Piper Cherokee I was considering purchasing. Steve gave it a clean bill of health and I am now the proud owner of a nice 1963 Cherokee B 160. I'd also like to thank those who sent me information regarding the tripacers as it was helpful in deciding on the Cherokee.

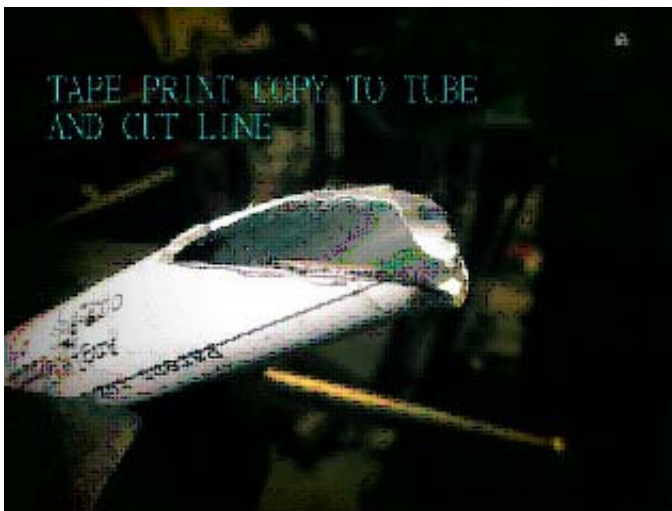
Russ

Sportair Workshops - Gas Welding

By: Stan Timmerman

Recently, I attended the SportAir Workshop that was put on by <http://www.sportair.com/>. The workshops are a quick way to learn a lot of information in a short amount of time. You do not have to own any equipment since it is provided during the course. The gas welding course was held in Houston. My instructor was Earl Luce. Those of you following the Steve Wittman tailwind and buttercup airplanes' design will know him. If you are not familiar with him, take a look at <http://luceair.com/>.

Having a background in machinery conditions my mind to think of accuracy on the order of thousandths of an inch. A Vernier caliper is not the tool for measuring a fuselage. Earl was none too fond of measuring with a pocket scale either. Welding creates distortions that dwarf errors from measuring accuracy. All that is really required is to grind a profile in the tube end that is more accurate than the thickness of your welding rod. I found a neat piece of software that does tube coping calculations: <http://www.metalgeek.com/static/cope.pcgi>. Basically, you 1) enter the dimensions of the two tubes you are trying to join, 2) push the calculate button, 3) then push the download button, and 4) print it out on your printer. With a pair of scissors, you cut out the picture and tape it around the tube, and grind away. Once you get it in your head that close is good enough things should go faster.



Fuselages can be made out of 4130 tube. This material requires some new thinking. With most steel you just throw the part in a bucket of water to cool. If you do that with 4130, you will need to pick up the part and throw it in the trash. There are only two welding processes that you should even consider when using 4130. The newest technology is TIG. The oldest technology is oxygen-acetylene. This course covered oxygen-acetylene welding. The process has many things to recommend it. Oxygen-acetylene equipment it is cheaper to buy and is friendly to 4130. As already mentioned, rapid cooling is death to 4130. With a torch, you not only control the point you are welding but can easily influence the rate of cooling. One of the biggest questions that arise for those that choose TIG is whether you have to go over

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it again with an oxygen-acetylene torch to reheat the area. My recommendation is to use a torch. It is the cheaper piece of equipment and whatever skills you develop during the welding with a torch could easily be adapted to TIG welding. Whichever process you use, rest assured it will not break at the weld. It will break near the weld. Slow cooling is required with 4130.

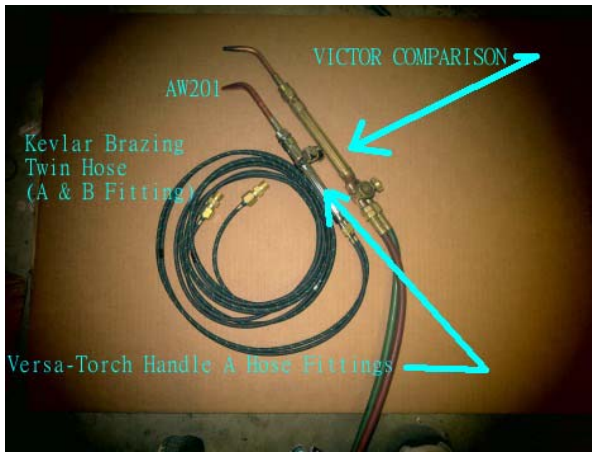
Speaking of technique, my first attempt in welding class was to try to do it like you would with a stick welder. This will not work. The proper way to control the puddle with oxygen-acetylene is to hold the flame along the seam. With stick welding, you wave the arc back and forth laying down a puddle. You need to forget all of your stick welding training -and do not even think of using a MIG.

Learning to weld with an instructor is helpful. If you try to learn by watching a video, then you need to know what the welder is actually trying to do. It happens so quick that there is no time to explain during the weld.

I won't go in to the details of setting a neutral flame but rather will describe what the welder is thinking. To start, figure out how to get your elbows braced on the table. This does improve accuracy, but, the goal is to increase the length of time you can weld without getting tired. Then, the welder approaches the metal with the tip of cone about 3 rod widths from the metal. The first approach will be at 45 degrees, and then he pulls away. Look for the orange heat to be the same on both sides. If both sides are not the same color, the welder chooses a different angle and approaches the seam again and pulls away. This is repeated until an angle that achieves the same heat on both sides can be found. This sampling process only takes seconds.

The next thing the welder is thinking -after choosing the correct approach angle- is how long it takes the puddle to form with the cone the correct distance away from the metal. If you have chosen the right size tip for the size of tubing, you will get a puddle in 3 seconds. Any result different than 3 seconds is a reason to think that you have the wrong tip or the wrong pressure. This puddle will form with the inner cone still some distance away from the metal. That inner cone is not the point of focus for the flame distance. If I wanted to cut metal, I would use that inner cone distance, but do not weld letting that inner cone touch the metal.

At this point I will digress and discuss the torch. First understand that there are several brands and within those several designs. A skilled welder can make use of all of them. If you have not already purchased a torch, then you should consider getting the aviation type. The aviation torch design is different than the Victor brand torch type you find at Home Depot. It does not cost anymore and is easier to use for welding a fuselage. The aviation design has the control knobs at the top -closer to the tip. The Home Depot kind has the knobs closer to the hose. Two companies that make aviation type torches are Harris and Smith. I personally went with the "Versa-Torch Handle A Hose Fittings (Smith Equipment)" (about a \$100). Then you need a tip. Remember to get the puddle in 3 seconds, it is a function of both the tip and the thickness of the material you are welding. The first and possibly only tip that you need is the smallest model AW201 (about \$28). I do not know numbers in the Harris line of products. An additional item I added to my setup was a small light weight hose. It is hard enough to control that critical angle of how the flame is presented to the metal without the hose yanking on the other end. I added a "Kevlar Brazing Twin Hose (A & B Fitting) (Smith Equipment)" for \$65. The price is ridiculous but I really did not want to tug on a hose. You can get two little brass fittings that will couple an "A" hose to your "B" hose.



After a puddle forms, the welder needs to think about **where** the puddle is flowing. This is where the oxygen-acetylene welder differs from stick welders. When a puddle gets too big on one side, the rod is dipped into it. This will instantly cool that side and stop the flow. The welder keeps the flame fixed relative to the two sides. He uses the rod to cool misbehaving puddles. He also is thinking about the thickness of the two pieces at different points. Even if he is not dipping the rod in the puddle at that instant, the rod can be used to protect one side from the heat. So the rod has two functions so far. Eventually, a hole will open up in the tubing. It happens to the best of us. When the skilled welder sees it happen, he instantly jams the rod in the hole, and the hole will vanish as quickly as it formed. We have the rod dancing around doing three things now.

As we approach the end of the seam, we use the rod for a fourth purpose, to protect the end of the seam. During the weld whatever heat we have is shared with both parent metals' sides. As we approach the end, we will find that the puddle grows too fast. The end of the parent metals will not have enough mass for the amount of heat we are applying for the middle of the seam. A neat trick Earl showed is tracing the torch up the rod. The rod will give one last drop of metal to finish the seam without burning a hole in it. There are other techniques also, but the process of welding is thinking about the puddle as it is now, and also what is about to occur with the puddle.

Earl also made a few suggestions about the rod. Before I took the class, I tried using the stuff commonly found where you get your tanks filled. It probably is not the place to shop for rods. The rods are not exotic and can be bought many places once you know what to look for. Just get the 1/16 rg45. Do not get ers70; it was meant to be used with TIG. The ers70 rods have silicon and we do not want that. You do not need exotic alloy rods.

Thin RG45 rods come in 3 foot lengths. That will not improve the ease of handling, so cut them in half. Another technique Earl taught us was to bend the rod two inches from the end. It keeps your hands away from the flame. If you did not bend the rod, then as you approached the end of the seam and trailed the flame up the rod to protect the metal, you would burn yourself. Earl does not use gloves. If the rod is bent and you want fine control of that rod for dipping, gloves will not help. Certainly the thick leather gloves will give you protection but are useless for accurately controlling the rod. So you can choose welding bare handed and bending the rod away from your hands or use thin cotton gloves. Presently, I am using very thin Kevlar gloves on the rod hand. The thin Kevlar will give a second or two of protection.

On the subject of eye protection, it is an individual decision. Gas welding is done with a shade 5 lens. The choices have to do with your vision. If you need glasses to read, you will need glasses to see the puddle. Choose the type of shades that are consistent with your reading needs.

(cont. from pg. 5)

One really nice thing about oxygen-acetylene is how it compares to other welding processes. Every other process I have used from brazing to stick welding all required extensive cleaning of the weld area before beginning. The oxygen-acetylene process uses a 6000F flame. Nothing survives that temperature. Not paint, oil, or rust -nothing. The cleaning of the parent metal is less important – as compared to TIG. This is important when using 4130. The 4130 tube will rust quickly without protection. A nice working flow for a fuselage welder is just spray WD40 on the welded areas at the completion of the days welding. You do not have to clean it off when you start the next day; the flame does it for you.

A few quick reminders about oxygen-acetylene safety:

- 1) If you transport acetylene let it rest standing up for at least 3 hours to reabsorb into acetone.
- 2) You cannot open the oxygen valve slowly enough. I have heard many theories on this one, but it comes down to the pressure will damage your gauges if it hits it by using a quick twist. Also, the oxygen tank valve once opened is open until the fully open stop.
- 3) You must secure the tanks in a vertical position. Do everything possible to keep them from falling over.
- 4) It is a good idea to stay away from the tanks that are turned on with a T handle.

Here is a list of other things to think about in no particular order:

- 1) Pops during welding suggest that you are using a tip that is too large for the gas flow you are using. Equally likely is the gas pressure is too low for the tip size. This becomes more evident when you rotate the flame perpendicular to the parent metal and the back pressure forces the flame momentarily into the tip. Pops can also be caused by a dirty nozzle.
- 2) If you grind on the tubing, you have to weld again. Sand blasting does not require re-welding.
- 3) If you use water to cool it, throw it away.
- 4) If you finish the weld -and move it away too fast- you will sometimes get a bubble in the final puddle. The solution is to back away slowly.
- 5) At the end of the weld, move the flame away slowly. Fast cooling creates brittle areas. If a break occurs, it will not be your weld; it will be tubing adjacent to the weld that cooled too fast.
- 6) If you do want to clean off WD40, think about using the least harmful chemical possible, Earl recommends denatured alcohol. You cannot use soap and water.
- 7) Fuselage welders leave their final work in a completely air tight state. There are a few techniques, one of which is to drill a hole in the tube, pour in linseed oil and weld the tube back up. I wonder how much of these practices are old wives tales and which have value. At the extreme edge of sanity are tube welders that pull a vacuum and re-pressurize with nitrogen and then re-weld the hole. I suspect that a fuselage will not fail in your lifetime, and no one will know what you did and why.
- 8) Remember that axiom of having the gap no bigger than the welding rod diameter; one quick way to deal with a larger gap is to create a larger diameter molten blob on the end and then use the blob to fill the seam.
- 9) If the rod freezes in the puddle, get out, then go back in and cut it off with tip of cone and just melt it into the weld as you restart.
- 10) Thermal mass determines the speed of puddle flow. This is particularly a problem at the ends. So the short solution is do not start at the end. Start away from the end, and when approaching the end, follow the flame up the rod protecting the end from excessive heat.
- 11) The standard method of starting a torch is oxygen off and low pressure acetylene. This has an unfortunate side effect of soot. It might be better to start with more acetylene flow. The soot will not be there with higher flow rates. If you are going to be doing a lot of welding, then avoiding soot in the air is important.

12) Sufficient gas flow is determined by the speed of puddle formation. Sufficient oxygen is determined by the inner cone. Too much oxygen is determined by a hissing sound and sparks coming off of the puddle.

Wanted for the new Chapter 958 Website

Stan is interested in collecting a list of (local) vendors for hard to find things, and have it available on the website.

1) How does one go about getting a hangar. — The newest member Gerald was telling me that the airport is trying to change the past practice. He believes that it was once common to get a 30 Year lease and build at San Marcos. He thinks the current airport management does not want to do 30 years anymore.

In general how have different members solved that problem. Airparks, current monthly rates at Lockart, New Braunfels, San Marcos?

2)Vendors

I got a lead from Gerald that there is a place in San Marcos where paints and aluminum etching liquids can be found. It is always possible to get this sort of stuff from Aircraft Spruce, but they have to add a HAZARDOUS SHIPPING charge. The charges might be as much as \$70 for something that costs \$20

I believe that composite material (WEST SYSTEMS) can be found from a boat supply place in Austin.

Contact: Stan Timmerman at: stimmerman@austin.rr.com



Quicksilver Sport S2SE Earns S-LSA Approval, Entering Production

QUICKSILVER AERONAUTICS Sport 2S model has been verified as a special light-sport aircraft (S-LSA), and the model will be marketed as the Sport S2SE, the company announced.

The company is ramping up production, said Will Escutia, Quicksilver Aeronautics president. The company is taking a new approach to production by creating “extensions,” or manufacturing locations other than the headquarters factory. In accordance with the LSA regulations, these extensions require Quicksilver to maintain full quality control while putting production closer to customers.

This is the first time a company has opened multiple extension facilities, and Quicksilver plans to open two new facilities at Air-Tech Inc. of Reserve, Louisiana, and in Rochester, Minnesota. The Sport S2SE will be available for \$39,999. Quicksilver reports it is one of the lowest-priced S-LSA models on the market. Amateur-built kits are also available. For more information, visit www.QuicksilverAircraft.com.



Sunseeker Duo Makes First Powered Flights

SOLAR FLIGHT ANNOUNCED that test flights of the Sunseeker Duo, the first solar-powered airplane with a passenger seat, have been ongoing since it first flew on December 17, 2013, at the company’s facilities in Voghera, Italy. The company aims to have the aircraft tested and ready to offer passenger



(cont from pg. 7)

flights by summer. The Sunseeker Duo is Solar Flight's third solar-powered airplane. Thanks to improved technology, this latest addition to the lineup features lithium batteries with seven times the capability of the company's first effort, Sunseeker I. That aircraft made history in the summer of 1990 when Solar Flight's Eric Raymond flew it across the United States—the first solar-powered aircraft to do so. The Sunseeker II was notable in its first crossing of the Alps. The project is led by Raymond and his wife, Irena.

EAA/ForeFlight Offering Two \$7,500 Flight-Training Scholarships

EAA AND ForeFlight, creator of the popular ForeFlight Mobile flight planning and electronic flight bag app for Apple iPad and iPhone, are teaming together to award a pair of \$7,500 flight training scholarships that will help two people fulfill their dreams of flight. The scholarships are open to anyone at least 15 years of age who meets the [application requirements](#). The deadline to apply is June 30, 2014. Recipients will be announced during EAA AirVenture Oshkosh 2014. Complete requirements include:

- a 500-word essay on "How I Will Use My License to Fly" via written document or video (.mov and .mp4 video format)
- Recipients will remain engaged with ForeFlight and EAA with updates on their flight training experience.
- The scholarship will be awarded in \$2,500 increments to the recipients and the flight schools of their choice. Recipients also will receive a one-year ForeFlight subscription and a one-year EAA membership.

