Shop Talk

The newsletter of the Sonex Builders & Pilots Foundation
sonexfoundation.com

February 2015

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387 Members
36 Voting members

www.sonexfoundation.com

Submissions are always welcome at
robbie@sonexfoundation.org or
eric@sonexfoundation.org

Shop Talk

Robbie Culver, President - Sonex Builders and Pilots Foundation

We now have 387 members, with 36 voting members.

Club membership is free, and for those who wish to participate in elections and help direct this member-run organization, a voting membership is $25 annually. Your donations help us keep the websites running, and allow us to publish this newsletter. We sincerely hope you enjoy it.

In this issue, most of the content is member provided - this is something we hope to continue. We would like to do this each issue, and we encourage everyone to contribute.

We are pleased to announce several upcoming regional events, both on June 13th, 2015:

2nd Annual North Central Sonex Fly-In - Wayne Flury, organizer

June 6th was the original date for the North Central Sonex Fly-In to avoid the local Buffalo Days summer celebration, which usually kicks off with a fly-in, car show and pancake breakfast, plus an air show. Last year the Sonex fly-in was the day before the Buffalo fly-in, which isn't necessarily bad, but it conflicted with a lot of set-up work (our EAA chapter has the pancake breakfast) and other things.

So, with the 2015 date of Buffalo Days set for June 14-21 (http://www.buffalochamber.org/buffalo-days.html) I thought I was good. Wrong!

Other scheduling issues required the Buffalo Days committee to change their fly-in to June 7, so I'm changing the Sonex fly-in date to June 13.

I apologize to anyone who made plans around the old date, but hope you understand and will still be able to figure out a way to come to the Buffalo Airport on June 13 - Buffalo Municipal Airport (CFE). Buffalo, Minnesota

Now I've got to get back into my shop and keep plugging away on parts (working on wings now. The fuselage is on gear and the engine hanging on the mount). Thanks to all of you who have inspired me to get back on the project!

Wayne Flury

North Central Sonex Fly-In Organizer

Cell: 763-670-6021

2nd annual Sonex Mile-High Fly-In - Jeff Shultz, organizer

I'm pleased to announce the second-annual "Sonex Mile-High Fly-In"! Please come join builders and pilots from all across Colorado and the Rocky Mountain region for an afternoon of camaraderie and information sharing.

The event will be held near Colorado Springs, CO, at Meadowlake Airport (KFLY), June 13, 2015. Fly-in's and Drive-in are welcome! Arrivals will start around 8:00 am, and the programs at 10:00am. We'll have burgers and dogs on the BBQ for lunch.

The presentations will be informal and interactive, allowing current builders and pilots the chance to pass along what they've learned to others. Some of the topics will include "Cowling Modifications", "AeroVee Assembly and Rebuild", "Jabiru FWF Installation Tips" and a review of the plans and building process.

Several of our local pilots plan to give "Sonex Smile Rides" as a way to show off the attraction of a Sonex and to hook future builders!

Meadowlake Airport is situated south of Denver's airspace and at the foot of the Rocky Mountains. It's easy to get in and out, and makes a great destination. If you plan to stay overnight, accommodations are close by and dry camping is available on the field.

Come out and support the Colorado Sonex Mile-High Club and make some new friends in the process! I look forward to a great turnout. Event website: www.sonex604.com/mile_high_2015/ For more information or to RSVP, please contact Jeff Shultz at sonex1374@gmail.com or 573-337-1903

Builders updates

Vic Delgado – Sonex 969 – Scratch Building

I have completed the right wing, wiring, and lighting, and am now working on completing the left wing before the end of the month (hopefully). I have also been spending considerable time preparing for Corvair College #32 in San Marcos Texas at the end of the month with the hopes of getting my 3.0L 120 HP engine completed.

After completing the Left wing and engine, I will begin on the Fuselage, the last major push towards completion. I have attached a couple of photos of my current progress including a photo after my recent tech counselor visit.

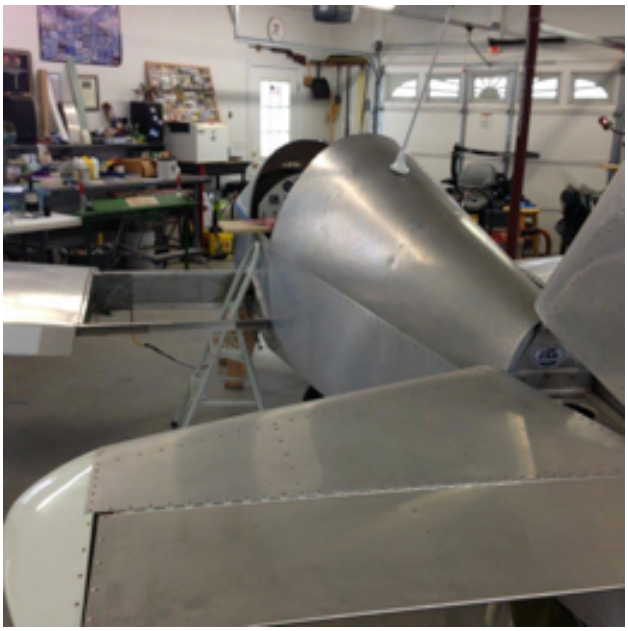
David Jones Onex #153

I have been working on this kit (alongside my father) for just over a year now. We have made great progress. This past weekend was spent on setting the thrust line for the AeroVee and mounting my new MGL Discovery Lite and V6 radio in the panel. Now to begin the task of wiring up everything back to the RDAC and then to the EFIS.

What a fun little project.

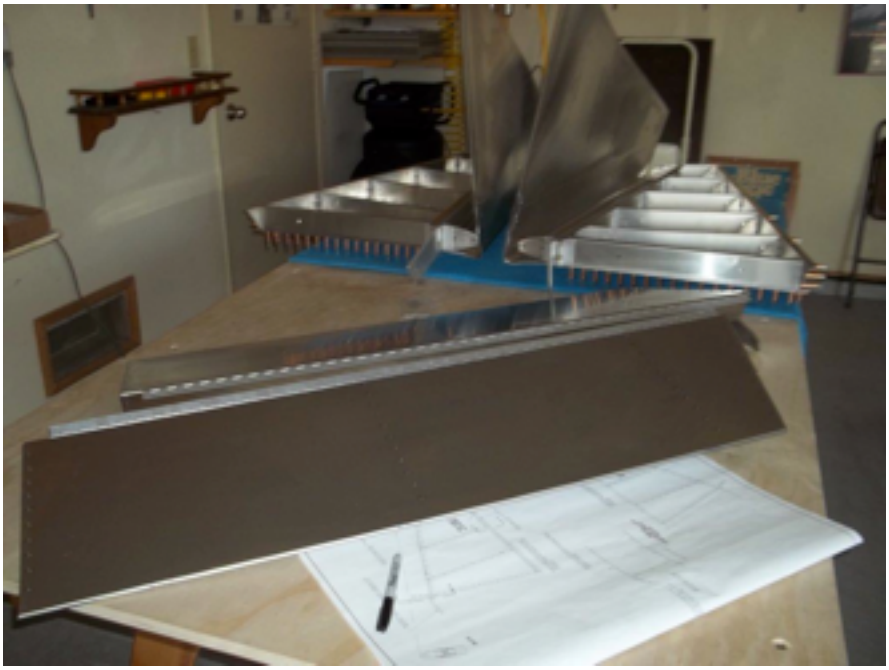
Frank B. Klimek Onex 090

I am still ~ three months from engine / taxi / flight testing. Out of town travel is my only holdup from time-to-time. The cowling and canopy have been fitted. The inner wing panel ribs and skins have been fitted and along with the canopy have been removed for easier access to the instruments and cockpit. The landing gear and wheel pants have also been fitted and removed for access to rivets along the lower wing root area. Exterior lighting finished and instruments nearing completion. I have an N number and an inspector etc. lined up. Looking at the end of May 2015.



Al Roberts Waiex

I got the Tail Kit for a Waiex about a month ago and have completed the Ruddervators and would have the Stabilators finished except I am waiting for a shipment of "flush" rivets from Sonex to arrive and then all I have left is to button them up. I should have them done before the end of February. I am anxious to began work on the fuselage, but the tech guys say it would be best to do the wings next.



Robbie Culver - Sonex 1517

I am building a Sonex taildragger with dual sticks, using many of the Sonex Aircraft add-on options such as machined angle kit, prefabricated spar, etc. Construction began in May 2011. I have finished the tail, both wings, and the fuselage. Over the Christmas 2014 holiday break, I also completed the AeroVee with turbo and hung it on the airframe. I used nutplates extensively on the firewall-forward assembly, and focused on making the wiring as neat and clean as possible.

The panel is mostly steam gauges, with a GRT Mini electronic display added for safety (I insisted on an artificial horizon). The radio is a FlightLine FL-760, the engine monitor is an original JPI basic unit, and the gauges are mostly VDO automotive. I also installed a beLite fuel level probe and gauge.

I added two landing lights, one incandescent and one LED, and an LRI that I scratch built. Another addition was a small wiring tray behind the instrument panel, from longeron to longeron. I have the hydraulic brake kit, and am modifying the tailwheel push rod.

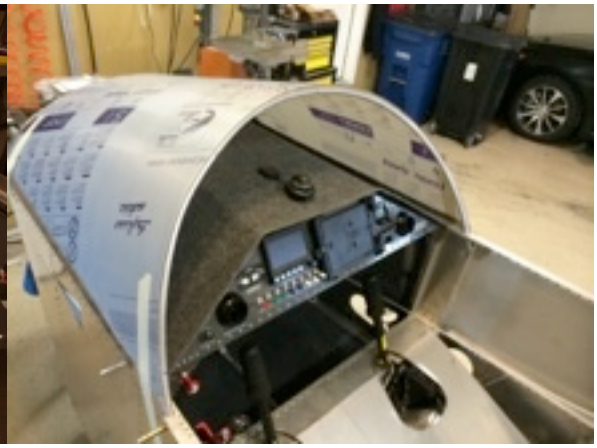
A project of this magnitude does not get done without the support of family and friends, and I have been blessed with both. I hope for a first flight in early summer 2015.

Scott Meyer - Sonex #1629

After taking delivery of my Sonex kit in late August 2013, I anticipated this project would take me somewhere between 800-1000 hours to construct and have ready for flight. I have 674.5 hours completed right now, and I'd like to say I'm in the "home stretch"…or as others have stated, "90% done, 90% to go"!

Since Thanksgiving (2014) I've completed several major milestones. Controls are installed and pretty much done. The landing (tri) gear is installed and the manual drum brakes are connected and working. The AeroVee 2.1 (non-turbo) engine was installed on the mount at the end of November.


Instrument panel is completed, electrical wiring is finished and the panel functions (that was a relief when the smoke stayed inside the wiring)! My panel is a combination of the MGL Xtreme mini EFIS, MGL V6 Com, and an iPad Mini running ForeFlight for navigation. I have a traditional slip indicator, Ritchie Compass with circuit breakers and switches, and a Vans eye-ball vent system (which I installed in the panel).

After finishing the panel I have completed the fuel system and permanently installed the fuel tank, glare shield and most recently finished the wind screen. That was a real challenge to bend and fit a flat piece of Lexan to a complex curve shape.

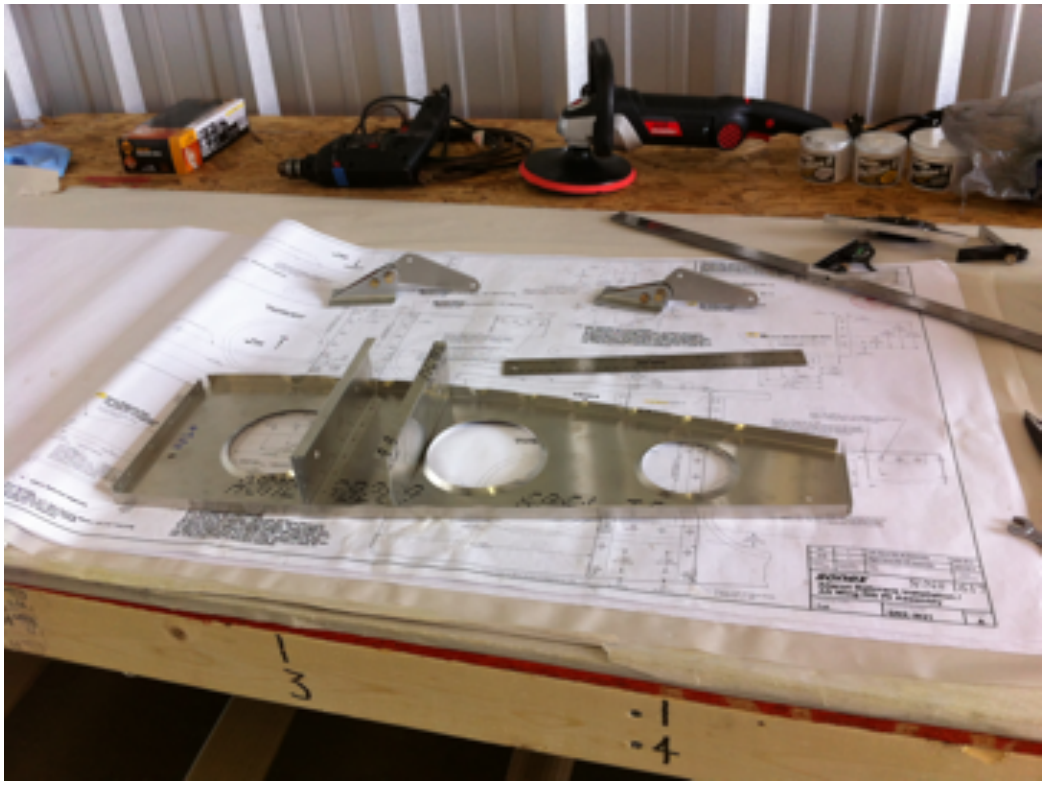
I'm currently working on the canopy frame assembly and hope to complete that in February. I made a slight modification to the latch hook angle and used a 2.5" x 2.5" stock to add an extra set of hooks for being able to open the canopy a little while the engine is running (ground/taxi operations).

Cowling is next, followed by engine baffles, completing the FWF engine/sensor wiring to the RDAC, then when the weather warms up tackle the Canopy trimming, fiberglass wheel pants and finishing the painting on the wing tips, cowling and misc. parts to complete the scheme I chose for my Sonex (P-51 Mustang Red Tail Squadron). Hopefully the first flight will be later this spring/early summer (2015)!

Earl L. Kirkpatrick, Sonex 1617

ASEL, Instrument & Commercial. 2100 hours total, about 500 hours tail wheel, 1500 hrs. complex, mostly in Mooney's. Sold my last Mooney in 1993 in order to start my own engineering company (couldn't afford both). With regard to the "elderly" builders in the forum, I'll turn 80 this coming July. I started construction in July 2013 after attending the Builder's

Workshop. I hope to have it in the air by my 80th birthday. The attached photos represent progress to date with about 1350 builder hours expended.

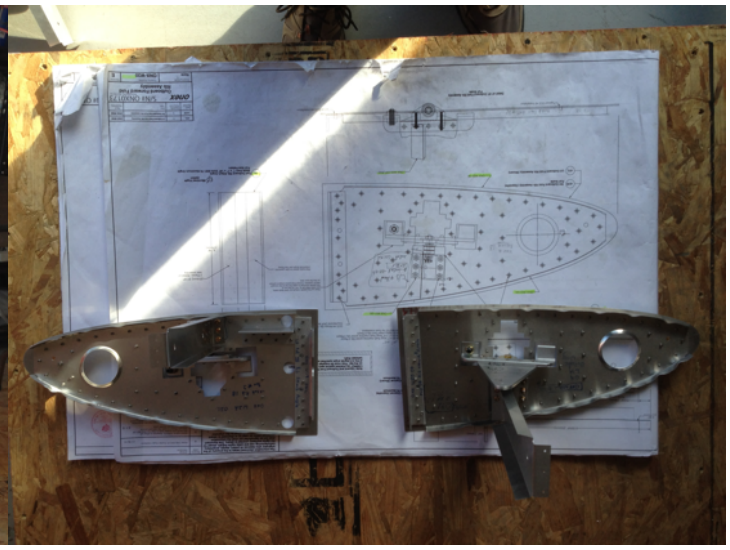


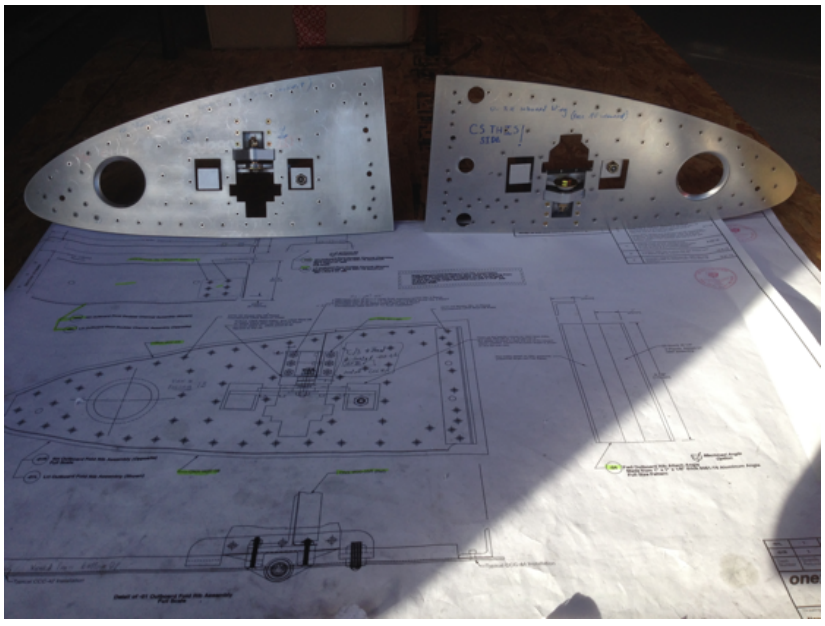
Don Hogue – Onex #0173

I started building in late 2014. Progress to date is:

Completed the horizontal and vertical stabilizers, rudder and elevators. Completed the inboard and outboard Fwd wing fold ribs including all 4 inboard and outboard aileron bellcranks installed on the ribs. Currently have the main center Fwd spar components deburred, updrilled to 3/32 and clecoed per the stack up – so nearing the per plan solid rivet install. I am enrolled in the May workshop and plan to take the transition training the following week.

At this time I estimate my Onex 0173 kit, minus powerplant, will be complete by late 2017. At that time I will either purchase a 80 HP Aerovee but if the Turbo is working out well for Onex I will purchase that at that time.





Featured Aircraft

Mike Smith's Scratch Built Sonex

The Story of Sonex #439

The full story of how Sonex N439M came to be is a long one, but I think it's worth telling even at the potential risk of TMI (too much information!).

I had been skydiving since I was 18, in college. I competed nationally for 5 years, which consumed all my weekends and free cash. But with all the time I spent in airplanes over my 2,600 jumps, I vowed someday I would get my pilot's license. I finally did that in the year 2000.

In 2001 I and two pilot buddies flew to Sun-n-Fun in Lakeland, Florida. It was there I had my first exposure to homebuilt aircraft. But as we walked around and looked, and my friend Dave was waxing on about how he'd like to build, and what it might be, I was shaking my head and asking out loud, "why the heck would anyone build an airplane when you can buy one for the same price?" figuring $25,000 for a used Cessna or Piper versus a similar cost for a homebuilt. Some of the homebuilts were undoubtedly pretty cool, but they were just never on my radar. Not even a little.

When I started flying a Piper Warrior cost $85 wet to rent at my local FBO. Fast forward to 2008 and that cost had gone up to around $115 wet. And with fuel prices rising, that was bound to keep moving upward at an alarming rate. And now I had a daughter and a larger house added to the financial mix. It began to occur to me that renting an airplane for 3 hours to go somewhere just for a meal with friends or family was going to be a $350 hamburger, and that just seemed absurd. Heaven forbid I go on a long trip like Airventure in Oshkosh, Wisconsin, where I might put 20 hours and $2,300 on the airplane! Even split 3 ways with my flying buddies, it was becoming hard to justify.

I did start looking for used airplanes for a while in Trade-A-Plane, but the more I thought about the costs of annuals and regular maintenance, the more I shuddered at the thought. We've all heard hundreds of stories of the annual-gone-wild, where the cost to address all the squwaks was going to be half the cost of procuring the aircraft in the first place. So that dream slowly faded away.

Somehow, I don't remember how, I got a hold of the 2008 copy of Kitplanes magazine's annual edition that listed all the experimental amateur built aircraft on the market. There were lots of tables and charts indicating number of seats, performance, and estimated time and costs to build. Almost absentmindedly I began to circle the ones that intrigued me and before I knew it I was researching about a half dozen of them on the Web.

If you take note of that date, 2008, you'll remember that was the year the bottom dropped out of the U.S. economy. I and two partners had started our own architectural firm in 2003, and by the beginning of 2008 we were finally doing reasonably well. But with the financial crisis came a natural decline in our business. If our wives didn't have good jobs we would not have made it through the next 3 years, because there were many months where we could not pay ourselves; only pay the bills to keep the doors open. And so my flying also took a natural back seat to the other financial requirements of life.

I knew that even if I could buy a certified airplane I would never be able to afford the care and feeding of that beast, so over the next year I continued to think about the why and the how of building an airplane. My reasoning probably matched that of many prospective builders:

I can keep my head and my hands in aviation during a build.

If I scratch build I can save money over a kit, and I won't have to spend a lot of money up front (I didn't have any money, so "a lot" was a relative term).

I would be my own mechanic, saving on the cost of maintenance and repairs.

I needed an activity to take my mind off my financial woes.

I liked to build things, and had spent a few years learning to make furniture in my basement. I learned that most of my woodworking tools could also be used to work aluminum, which is relatively soft.

If I pick the right project I can build the whole thing in my basement.

So again I went back to the Kitplanes issue and began looking again at aircraft that fit my latest criteria:

Available as plans-built

Small enough to build in my basement (I have a basement that walks out into the garage); there was no way I could afford a hangar

All-metal, since it would be tied down outside (hangars go for $500/month around me)

Economical to operate

Aerobatic (at least gentleman's aerobatics; loops, rolls, spins, etc)

Speed comparable to the Piper Warriors I usually flew

Reasonable (in aviation?) estimated cost to build and finish

In the end it was the 2-seat Sonex that I settled on. With their VW conversion AeroVee engine it looked like I could build a finished airplane for just over $20,000 if I were frugal. The next task was to convince myself I could do it, both financially and in practice. After convincing myself I had to broach the subject with my wife. There was no way to do this without her support.

My wife Gail thought the idea of me building a plane was a wonderful idea. But she reminded me we were financially challenged, and we had a family of three (my daughter Sophia, then 4 years old). My reasoning was that I could still rent a plane if we wanted to take a family trip. And buying the aluminum angles and sheets required for a large part of the build, was fairly inexpensive. I would bank on the economy, and my business, recovering before the big ticket items came due.

During that year I visited a Sonex owner near me, Ian Clark. Although I didn't get to fly in it, I did get to sit in it and ask questions. Later that year another Sonex builder, Aaron Knight, was kind enough to fly up to my airport and give me a ride. He had the 120 HP Jabiru and wow was that fun! I was grinning ear to ear when we landed, when my wife walked up and asked, "can I get a ride?" I wasn't expecting that! She reasoned that if she were going to fly in mine someday she'd like to know what it was like. She had a great flight! Thanks Aaron!

So on Christmas day 2008 I opened a small box from my wife. In it was a photograph of a Sonex in flight, with "Go for it!" written across it. Yes!

There were a few financial hiccups over the next month or so that called that decision into question, but in February of 2009 I got started. I bought a used set of Sonex plans and about two dozen small parts that another builder had made before deciding it was not the project for him. Hey, I was trying to save a few dollars!

When I got the plans I did what most builders, especially scratch builders, did. I just about had an acute anxiety attack! How the heck was I going to do this, and where do I start! For the next 5 plus years I kept repeating the mantra: "How do you eat an elephant? One bite at a time." I decided to do nothing but build parts for the foreseeable future, buying aluminum materials as I had money to do so.

I found a local supplier of the 6061 T6 aluminum that the airplane called for, and that cut shipping costs to zero dollars. More cost savings! I spent the next year making parts, without ever putting two of them together. I was creating my own Tinker Toy set. It is a serious testament to just how good the Sonex plans are, that when I finally did put parts together,

99.9% of them fit.

As soon as I started building I had one major decision to make: whether to build a tricycle gear airplane, or a tail dragger. I had no tail dragger experience, and had heard all the stories of angst and horror about trying to tame that monster. But a tail dragger LOOKED COOL! And reportedly the Sonex fuel tank could hold an extra gallon of fuel with the tail down. It also weighed a little less, and had a little less drag. So I bit the bullet and reasoned that if hundreds of thousands of other pilots could fly a tail dragger, so could I (I had 350 hours of flight time and an instrument rating at this time).

The other major decision had already been made. The $7,000 cost of the 80 HP AeroVee engine was the only thing I could possibly afford. The $20,000 plus cost of the 120 HP Jabiru might as well have been a million dollars for me at that time.

In my many months of research on home building I bookmarked MANY helpful web sites. Many of those projects were on the Kitlog web site. I tried the Kitlog software and found it to be just about perfect for my needs. It allowed me to track costs, track my building progress with text and photos, and post it all to the web. The only downside I found was that you could only post 3 photos per log entry.

There were so many times in the next 5 years when I really needed to be able to post at least 4! But that shortcoming never changed, so I took to making multiple entries on a given day, to get around that. I was very good about my logging, almost always posting the same evening as I did the work. I have received feedback from other builders that have used my site for help and inspiration, which makes me feel great. There were so many other builders' web sites that helped me, I felt I was giving something back.

The online Yahoo! Sonex forum was also a tremendous help, connecting me with builders all over the country and the world. Many questions were asked and answered there (the forum has since moved to sonexfoundation.com/Forum.php).

My business struggled for a couple of years, but going to the basement each night and

building parts was nothing short of cathartic. It was therapy. It was fulfilling. It was fun. I would turn on the TV, watch a DVD, Netflix or a football game, and work from 9:30pm (after my daughter went to bed) to 12:30 or 1:00 in the morning. I'm a night owl, so this was normal for me. It was important to me not to take up family time building. So I almost never worked in the daytime, even on weekends.

As the parts and assemblies got larger and more expensive, my business was improving enough to keep up, and so I never had to stop building due to finances. Not that things weren't tight at times, but where there's a will there's a way.

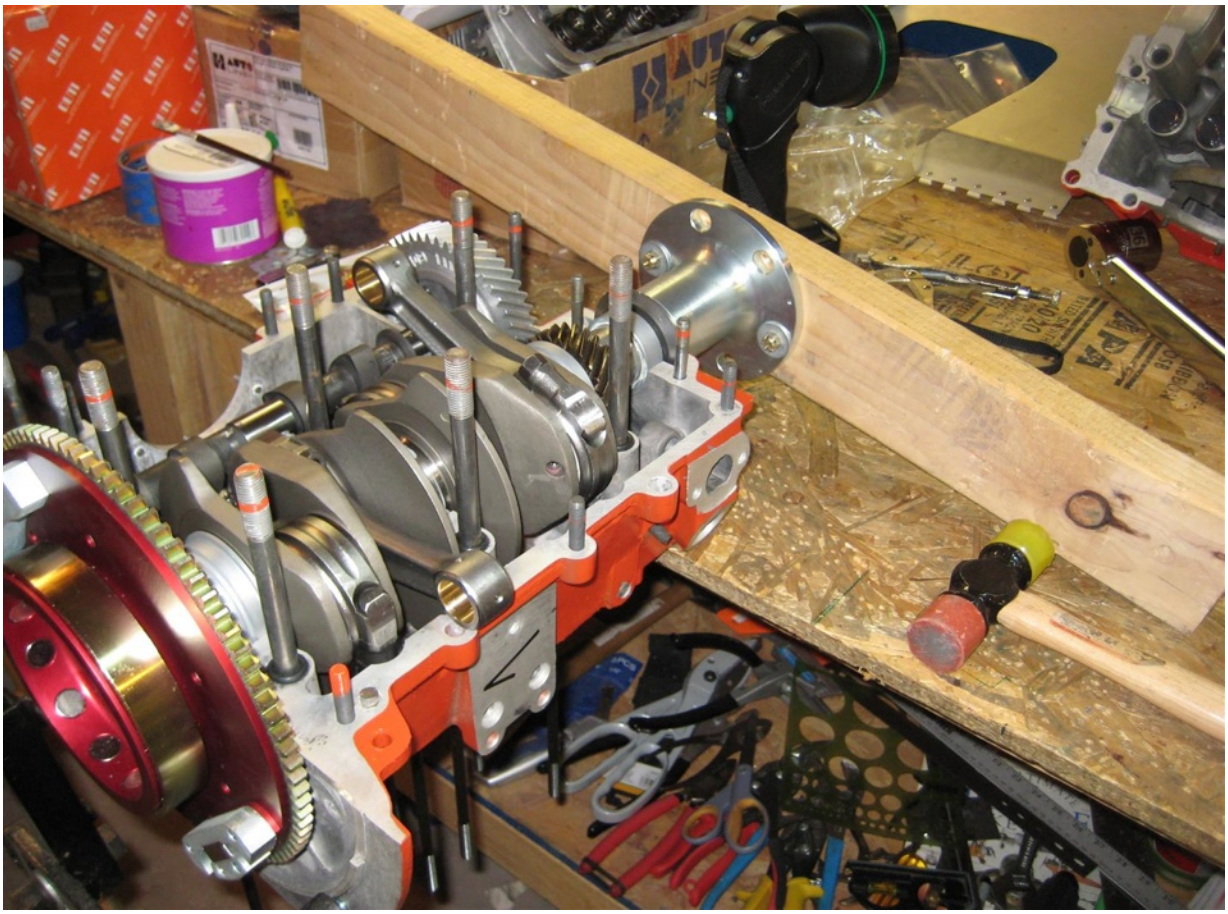
The year I started building I began looking for other Sonex builders in the area. I needed sources of inspiration and help, but as any builder can attest, it's also about being part of a common community. I found some through the Sonex web site, which offered the names and email addresses of other builders (with their permission). I began contacting them individually, but as I got more and more addresses I began contacting them as a group as well. I lamented that there was no northeast (I'm outside of Boston, Massachusetts) grass roots Sonex organization, as there were in some other parts of the country.

After several comments of "yeah, we ought to have a fly-in," it became clear that nobody was offering to make it happen. So having already bitten off possibly more than I could chew (building an airplane), I said what the heck and started making plans myself. With lots of input from the others on the mailing list we decided on the Dillant-Hopkins airport in Keene, NH (EEN).

With the help and support of the local EAA 1314 chapter, and Glenn Hunt (a member of that chapter, and a Sonex builder on the Keene airport) we organized the First Annual Northeast Sonex Fly-in. It was a tremendous success, and in 2014 we had our 6th annual event.

With the airframe well under way, in October of 2012 I received my AeroVee engine. This engine is only available as a kit; it cannot be purchased ready to fly. Building an airframe didn't concern me. Building an engine did. What I liked about it was that I would know the engine intimately when it came to maintenance and troubleshooting. But the closest I'd come in the

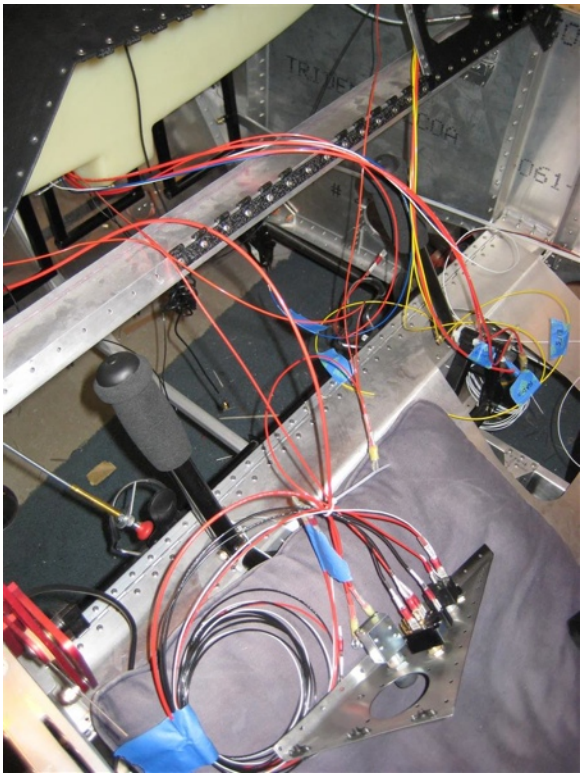
past was nearly 30 years ago when I put a lawn mower engine together in shop class.



Some AeroVee builders said they put the engine together in a couple of weeks. I took about four times longer. As good as the AeroVee instructions were, there was still too much that the installation instructions took for granted, with respect to how much the builder knew about engine building techniques, tips and tricks. I depended heavily on the input of other builders and their web sites.

At every point I asked myself if I was confident enough in what I just completed, to trust my family to fly behind that engine. I eventually got it done, but I have to say the engine was and is my only area of angst when flying my homebuilt. The Sonex is built like a small tank. It's going to work and it's not going to fall apart. But engines are different. And I built this one myself. Just being honest.

As I was reaching the home stretch I had to begin wiring up the airplane. I could wire a new switch or light fixture in my home. But to say I was clueless about the wiring of my airplane would be a vast understatement. As far as I was concerned it was all voodoo and black magic, beyond my mortal understanding. So I took an EAA Sport Air Workshop for electrical systems. That definitely helped, but I still could not figure out how to even start on a wiring diagram; the first step needed before anything got wired up.



I read Bob Nuckolls' AeroElectric book, which came highly recommended. But the attitude of that book was 'I'm not going to tell how to do something, I'll just tell you how electricity works and let you figure it out.' That was not at all helpful for me.

What finally got me going in the right direction was an email from Mike Kelley (Sonex 1284) [I'm actually not positive of this attribution, so if I got it wrong perhaps someone can correct me], another Sonex builder, sharing his wiring diagram with me.

Although my own setup was different enough that I couldn't cannibalize his for mine, it did contain just the right information to give me the proverbial AHA! moment when that great big light bulb came on over my head! Without that diagram as a jumpstart, I'm not sure how I could have proceeded. I used my CAD program to create my first diagram, and modified it over the next few months as I learned more and made improvements.

I decided not to try to use industry standards symbology, which was still too confusing for me to understand and follow. Other than showing grounds in the familiar format, everything else is circles, squares and rectangle with labels inside, connected by simple lines. It works brilliantly for me, and I'll bet anybody can understand it, even an electrical neophyte like I was. I spent more time learning about electrical systems than any other task in the building process. I have since shared my diagram with others, hoping they will find something useful in it.

So on March 22, 2014 it was time to move the airplane out of the basement and into the garage. The engine was hung and all the wiring was complete. The Sonex wings are removable so they were on a wing stand and did not have to be contended with. I had turned my 3 foot wide door into a pair of doors six feet wide. But he Sonex tail is 7' wide, so we knew we had to rotate the entire fuselage and engine 45 degrees to get it out. We used an engine hoist with straps going over the lift arm, to the engine mount. Once raised off the floor we slid the straps

around the hoist arm until the tail was at 45 degrees. The hoist is on wheels, so we wheeled it out until the tail cleared the door, and then rotated it back to level. The bird had left the nest!

I worked on the remainder of the tasks in my garage through April, until I had to move it to the airport (Minuteman, 6B6). I temporarily rented a part of the airport owner's hangar so I could install the wings and finish all the final work to make it airworthy. Although only 10 minutes from my house, that move drastically changed how I could spend my time on the plane. I shared the hangar with three other airplanes, so I could not leave my tools and parts lying around. That meant I had to spend time setting up and putting away each time I worked on the plane. And I had to decide what parts and tools needed to travel between my home and the airport to supplement what was already there.

I never would have finished the plane if I had had to work this way through the whole build! Working in my basement was THE key to finishing this project. I know one builder (Michael Jackson) who built a Xenos in his downtown townhouse. The Xenos is the motor glider version of a Sonex, with very long wings. Under construction his wings crossed from room to room, across the bottom of the stairs. He built a plywood platform to climb over the wing to get to the stair. Removing the plane from the building consisted of removing the front windows. Where there's a will there's a way!

After 5 years and 3 months, on May 25, 2014, Sonex N439M received its airworthiness certificate. And on June 21 it made its first flight! I flew the heck out of it to get my 40 hours of Phase 1 time flown off so that I could fly it to the 6th Annual Northeast Sonex Fly-in. I finished my flight tests at 42 hours, and made it to the event with a week and a half to spare. I was able to give a couple of demonstration flights to other prospective builders, just as others had done for me. That was very satisfying. Incidentally, my wife insisted on being the first passenger after I flew off my time, and my daughter got the second ride.

Now the plane is tied down outside, in cold and snowy New England. So again my work patterns are different. I can only work on dry days, that aren't too cold, and in daylight hours. I have only basic tools in a tool chest at my tie-down. Everything else has to be transported back and forth, or parts made at home and brought to the airport when able.

I have just over 60 hours of time on the plane now, and I've done spins, loops and rolls (I got training in a Super Decathalon). In cruise I'm burning less than 4 gallons/hr. If I have a maintenance issue I can fix it myself. So I certainly am spending less money per hour to fly. Of course I spent $28,000 instead of $20,000, but I'm having a great time and have no regrets about my project, other than I wish I could have afforded the bigger Jabiru engine.

So what would I do differently if I had it all to do again? Not much, if anything. Maybe I'd change the order in which I assembled some things, but that's pretty minor. And what have I learned? OMG, are you kidding!?

Will I build again? Not in the near future. Disposable income needs to go to more family-centric projects, college will need to be paid for in the not too distant future, and for the moment I have a flying airplane, so there is no need. In my retirement years perhaps I'll build a tube-and-fabric WWI replica. That would be cool!

What an amazing journey I have been on, and what wonderful people I have met along the way! What more could I ask for?

Michael Smith

Maynard, MA

Dana Baker's Scratch-Built Sonex

What is your Sonex's (Waiex/Onex/Xenos) Serial number

Sonex 1534

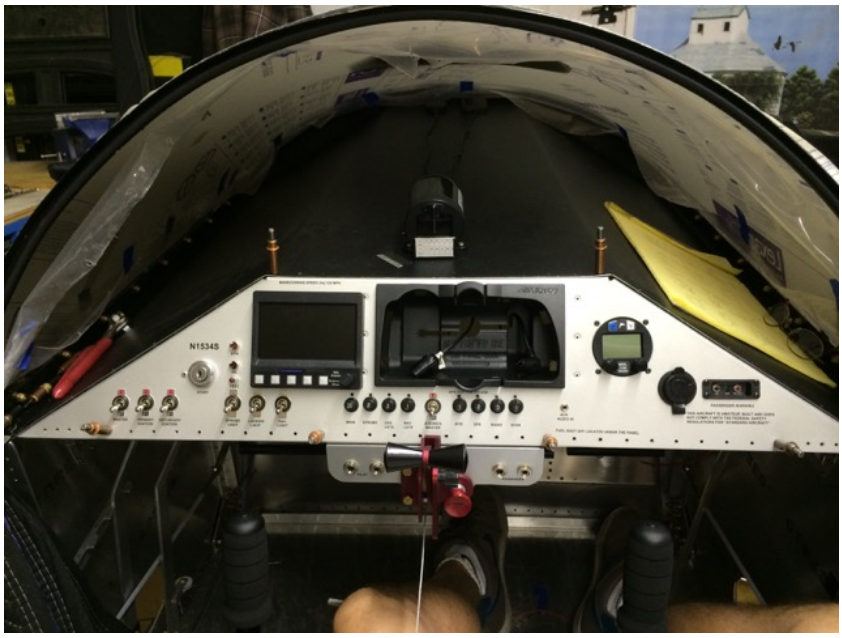
What gear configuration do you have? Any modifications to the stock setup?

Conventional gear. No modifications. My motto for the build has been K.I.S.S. Keep It Simple Stupid. I have stayed to the plans.

When did you start building and when was the first flight? Started building in December 2011 I was out of town working for 11 months during this time and could not build. First flight in a couple weeks.

What do you have installed? Please be specific - Engine, electronics, etc. A full list please

Aerovee with top mount oil cooler, MGL Extreme, MGL V6 panel mount radio, Garmin 295 mounted in the panel, MGL SP6 and SP7, MGL RDAC, Ameriking AK-451 (406MHz) ELT, Sandia STX 165R remote Transponder, SKYSPORTS NON TSO PEDESTAL MOUNT COMPASS 12V 24V LIT, Duckworks LED landing light, AveoFlash LSA navigation lights.



What modifications and customization did you do? Center Throttle/Mixture with headset jacks.

What else do you have planned for the airplane?

I plan to volunteer for young eagles flights. Travel around the country.

Where are you based?

KWJF - Wm. J. Fox Airfield Lancaster, CA

What made you choose Sonex?

The company and building community. I was looking at adds for a piper pacer. I was really just looking and wishing I could own my own plane. I saw an ad for plans. I spent very little time checking out the Sonex website and the user groups. I think it was a 20-minute decision if that. I was at Airventure in 2010 and just passed by the Sonex I didn't give much of a look except for that big graphic price tag they hung on it (I could afford that I thought). I never wanted to build an airplane. But I have several friends that are builders and they tried to get me to do it. So I just bought the plans and transferred the ownership. When I got them in the mail I thought I could never do this. But I remember someone wrote to take it one page at a time. I was going to buy sub kits to get this done. I did not have the money for the tail kit so I drove to Aircraft Spruce and bought some aluminum sheet and started to scratch build the tail. I never could save enough to buy a kit. My wife said that this plane is my addiction. I just would buy parts a little each month to keep me busy. Before I knew it I had an plane sitting in my shop. One page at a time.

What did you find most challenging about this build?

The canopy has been the most challenging. It is on but I know I could do it better now that I have done it once. I will re do it when I have some time after the plane is flying. Did I say the canopy? I just finished fitting the cowl that takes first prize. It was very different then building the rest of the plane.

What would you do differently looking back? Nothing for this project. I wish I were rich enough to afford the Sub Sonex.

What advice could you offer to someone currently building a Sonex?

Take it one page at a time. Use all the resources available especially Sonex tech support.

Do you have an online build log or web site?

Expercraft http://websites.expercraft.com/gripdana/?q=home

Flicker https://www.flickr.com/photos/90889513@N04/

What can you tell us about the first flight? How did it feel? Did anything surprise you about the airplane?

The inspection is scheduled for February 28th. The first flight will be that day or the next day. Weather permitting

How did you prepare for that first flight? Extensive tail wheel training in xwindy and calm conditions.

Now that you have flown the Sonex, does it match your expectations? TBD

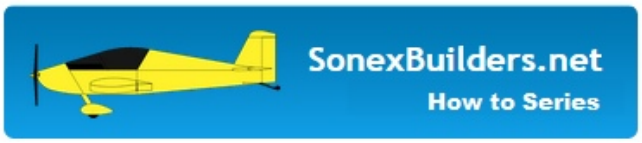
What goals do you have now? (Trips? Completing the 40 hours? Going to Oshkosh?)

I plan to volunteer for young eagles flights. Travel around the country.

After the first flight and flying off the 40 hours it is straight to Oshkosh with a side trip to visit family on the way.

SonexBuilders.net Forum Tips

By Chris Balthis, Owner, SonexBuilders.net



Inserting Images in your SonexBuilders.net Posts

Images can take up a lot of memory. One or two isn't so bad, but with nearly 1000 members each including one or two, the data ads up quickly. In order to keep the amount of data and costs down for hosting SonexBuilders.net, there is a preferred method for including pictures with your posts.

The first thing you need to do is to find a place other than SonexBuilders.net to host your images. You can google "free image hosting" and find several options. There are many to choose from. A few examples are:

Postimage.org
Tinypic.com
Photobucket.com
Imageshack.com

Some of these will allow you to resize the image easily. Why is resizing important? Have you ever seen a post where the image goes beyond the screen and you can only see part of it? Have you ever seen an image so small that the important details are hard to see? To avoid those issues, you will want to upload your picture to about 640x480.

Ok so you have uploaded your picture…. Now what? The site that you use to upload your image will have a direct link to the image somewhere and it is usually labeled "direct link". You need to find that direct url (website address) and copy it.

The next step is to include [img] and [/img] in your post in the spot where you would like your image to appear. That is the code that tells the forum you want to display a picture. After you put the img tags in your post the final step is to paste the direct link that you copied between them. The final text in your post will look something like:
[img] http://www.randompicturehostingsite.com/myuploadedairplaneimage.jpg [/img]

That's it… that simple. Just upload, find the link, copy and paste it between [img] and [/img].

For a more detailed tutorial, visit http://www.sonexbuilders.net/viewtopic.php?f=20&t=895

Building an Aerovee

Scott Meyer, Dana Baker, Robbie Culver

This article is intended to assist builders and identify areas each of us found challenging. It is not intended to criticize the kit or its instructions, correct any errors in the manual or on the part of the builder, or replace the excellent technical support the factory offers.

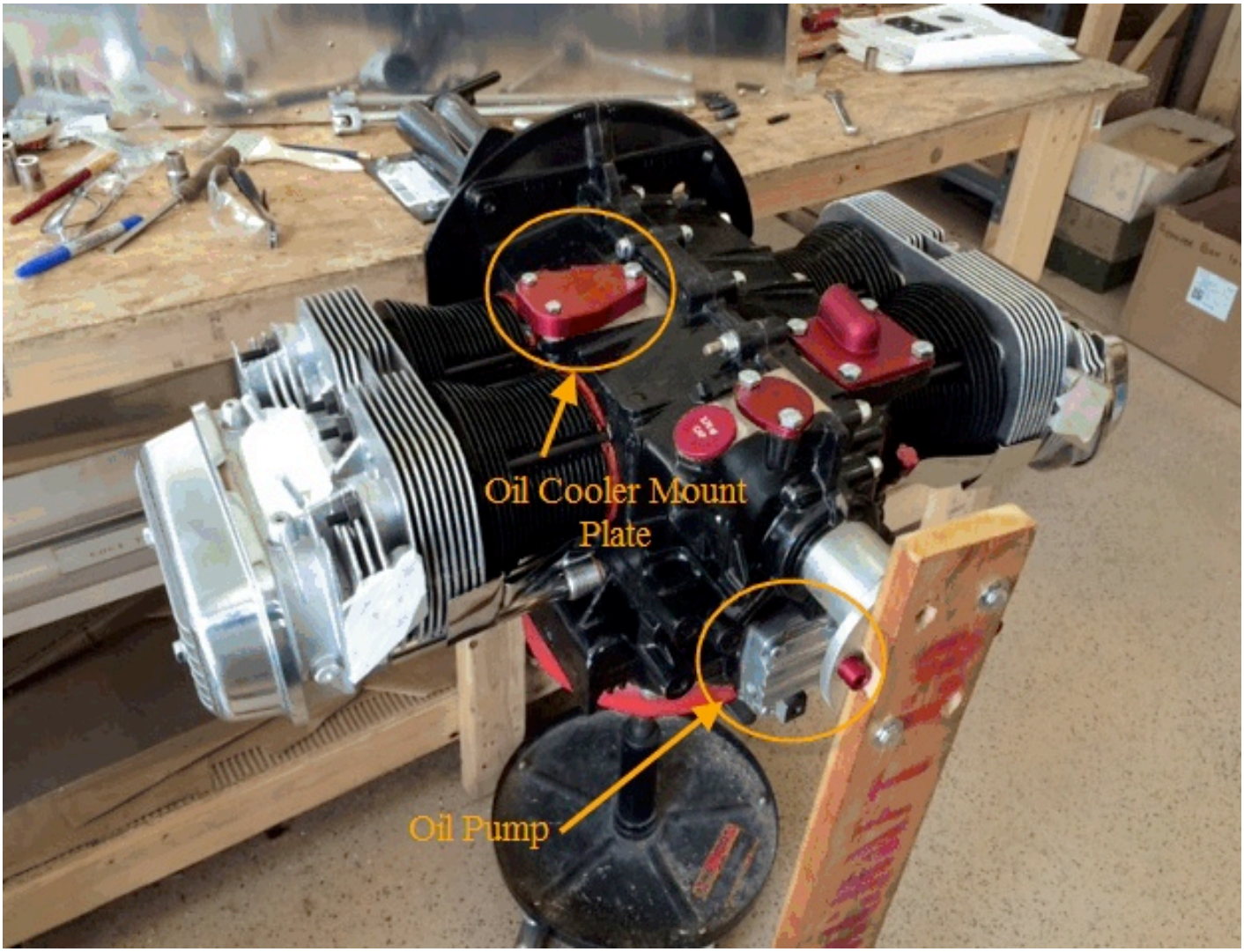
Scott Meyer

The DVD is a bit outdated. The manual is pretty good. Sonex only sends a printed B&W copy with the engine kit, but I found a current PDF online that is in color which I kept open on my iPhone and iPad for reference. Be sure to check it as there were a few technical updates in the electronic PDF that were newer (version) than what was printed.

http://www.aeroconversions.com/support/instruction_sheets/AeroVee_2point1_Manual.pdf

1. Inventory everything first. I found two missing large O-Rings for the main case bolts. Joe at Sonex promised replacements but they never arrived...so I found a close size at the local ACE/True Value. In Sonex's defense I only asked once and I'm sure they are busy. Everything else was in my kit. Also do yourself a favor and make a list of the special sealants, lubes and loctite needed before you start. There are some items not mentioned at the beginning of the manual that are needed later on.

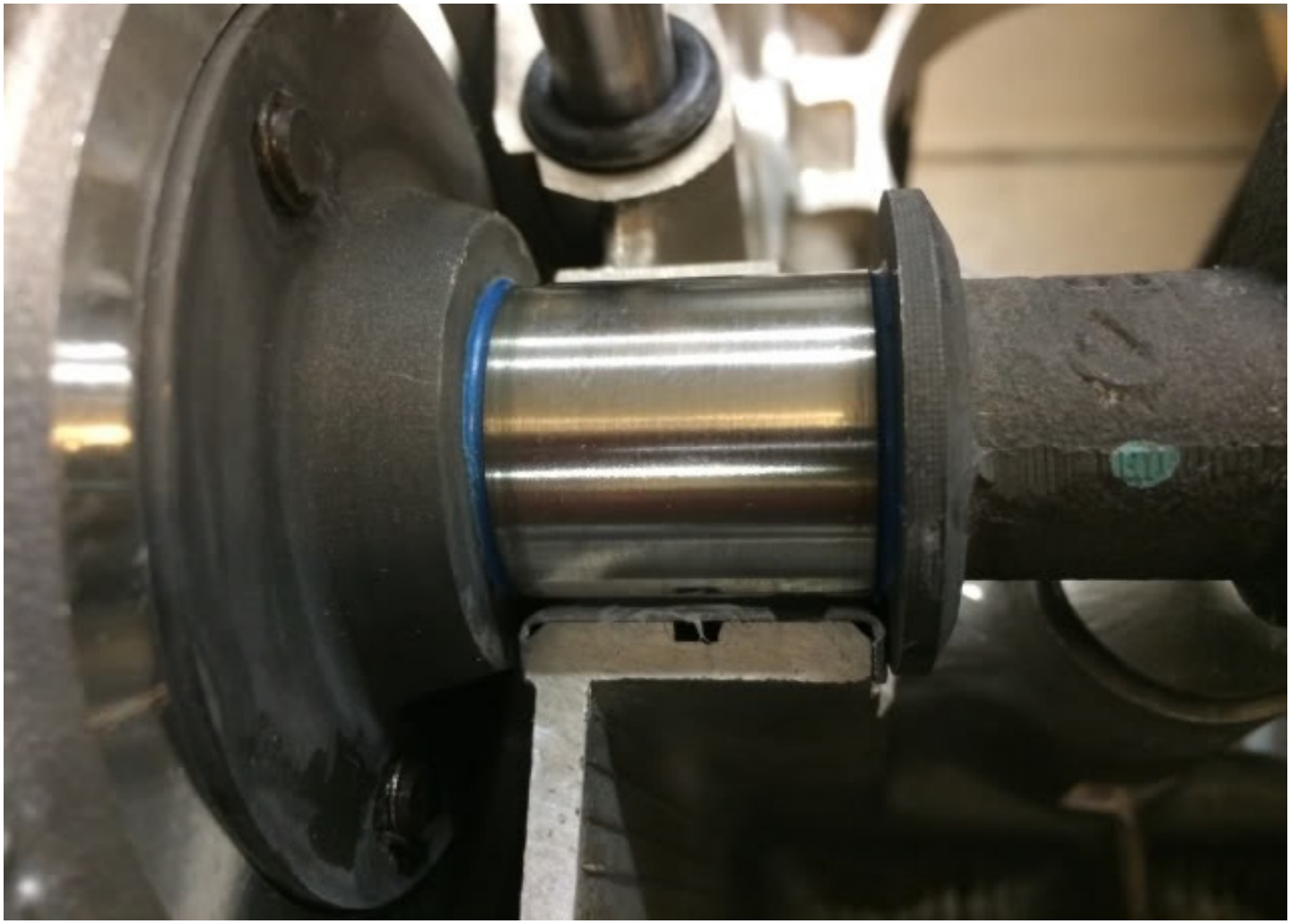
2. Make a decision on the Oil Cooler location when you order or at least before you get too far into the assembly? Top Mount or Bottom Mount. I chose to go Top Mount...after I installed the kit supplied OilPump, and (top) Oil Cooler bypass plate (red anodized aluminum part). Discussed with Kerry at Sonex about exchanging the parts (kit supplied Oil Pump to straight Oil Pump for Top Mount Oil Cooler - and the Top Oil Cooler Mount plate) they offered to do an RMA and exchange but I could not get the oil pump out (without damaging it) and the anodizing was scratched from the bolts...so I told Sonex thanks for the offer but no thanks. Ordered new parts to mount the Oil Cooler (top) but will use a bypass hose to connect the ports on the Oil Pump as suggested in the manual.



3. Painting the engine: The Case is magnesium, the heads are aluminum, the cylinder barrels are steel. I painted my case and cylinders "Gloss Black Engine Enamel - 500 degree"...the only item that really needs painting are the cylinder barrels. I cleaned all of the oil (causoline) from shipping off the metal using brake clean (where gloves and respirator when using this) and then wiped all of the metal down with shop towels. Tape off the opening and areas like the case halves mating surface. Sprayed several light coats of the paint until i was happy with the finish.

4. The Connecting Rods use a 12-point, 11MM bolt head...and call for "Moly Lube" to be applied to the threads. Had a heck of a time finding this in an aerosol can...then found out the CAM lube supplied for the solid lifters...is Moly Lube. Just apply some of this to the thread then torque to spec. Save yourself the time and cost of buying the spray.

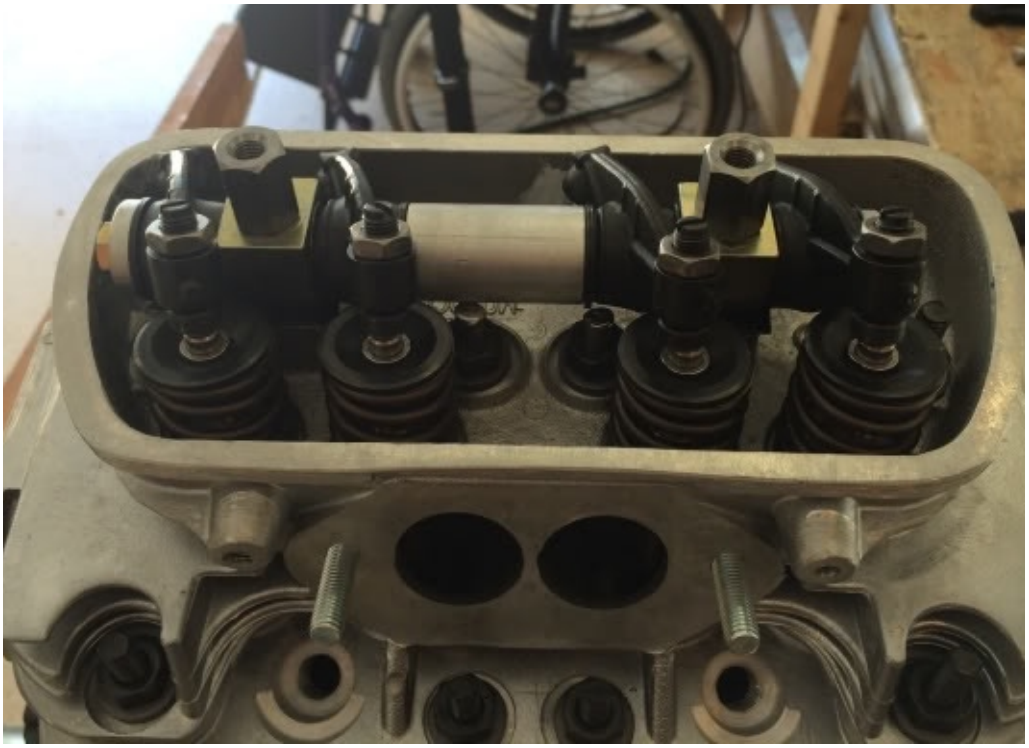
5. The Cam shaft in my kit was a very tight fit into the cam bearings at the front where the Cam gear is attached. Talked to Joe Norris at Sonex and he said to just finely clearance the front and rear flange of this bearing surface until the Cam seats.



6. Case Sealant. There was a debate on what product to use...again I spoke to the factory and got some (mixed) feedback. Fellow local builder and Waiex pilot Mike Farley gave me a tube of Permatex Anerobic Gasket maker...which he used on his engine rebuild. The factory scolded me on-line for not "following" the manual - which says Aviation Gasket Maker #3....and also for my use of Red High Temp RTV on the cylinder bases (shims)....In their DVD they show using Red "Silicone" sealant (i.e. RTV) for the Cylinder bases. Make your own decision on this.

7. You will need to trim the long cylinder head threaded rods (at least three inside of the cylinder head under the rocker arms) and two under the intake elbows. Tape off openings inside the heads, cover the engine...and use a cut off wheel (carefully) on a dremel tool and it's easy work.

8. The rocker arms are a little challenging to get the spacers in the right position so the roller rocker sits in the correct position on the valve stem. Make a sketch of where they go and make sure not to remove any from the overall assembly. Take your time, follow the instructions for position, and after torquing them down, make sure they still move (and are not bound up). Don't forget to adjust the valve clearance before closing up the valve covers!



9. Prepare the flywheel and rear seal per the manual and torque the gland nut to spec. It takes a lot of force (227 lb. ft.) and special Loctite 272.

10. Preparing the rear of the engine for the accessory case, magnetrons and stator. Follow the manual here, the directions are pretty thorough and straight forward. Based on feedback from Mike Farley I wrapped the steel (.010) gap shim for setting the mags with two wraps of painters tape (probably made the gap around .018-.020). Mike Farley indicated on his AeroVee the steel shim was not enough gap and he had rubbing wear on his engine and re-gapped it later to this thicker spacing.

11. To make engine installation easier, complete the assembly of the rear of the engine accessories, but don't loctite the 6 small cap screws for the alternator stator to the accessory plate. (*Editor's note - Sonex Aircraft LLC does not "approve" or in any way sanction this procedure. The factory states to do it the way the manual calls out. Any deviations are not supported.*) Remove the stator, and also the accessory case from the back of the engine. Install the accessory plate to the engine mount with the supplied rubber bushing, fender washers and spacer washers. It helps to squirt the rubber bushings with some soapy water as you fit the parts into the accessory plate and engine mount frame.

12. With the help of one or two people, you can now lift the engine onto the airframe and mate the back of the engine to the accessory case. I think it took us five minutes to install the engine using this method, and now special hoist or stands were needed.

13. Note the position of the firewall items in the photo above. I plan to upgrade to the Turbo AeroVee in the future, and wanted to avoid the trouble of relocating items then. Based on all of the pictures I could review of the Turbo installation, I decided to place everything on the left (pilot) side of the firewall. The battery box is per the plans for the Odyssey PC625 (only I modified the front panel to be hinged for easy battery install and removal). To the left of this is the Master Relay Contactor, then the coils are to the left of this, but still on the right side of the centerline. The voltage regulator is directly below the coils, and I have a ground tab below the voltage regulator. My RDAC for the MGL is mounted high on the firewall above the ignition coils. The only item on the right (passenger) side of the firewall is the Usher gascolator, pretty much in the plans called for location.

I'm still completing the engine sensor wiring and baffles, so there may be a few more items that are yet to be discovered that may help the next builder.

Dana Baker

My Aerovee engine building experience

I am finishing the final details of building and installing my Aerovee with a top mount oil cooler on my scratch built Sonex. It has been 33 years since I rebuilt a VW engine. The overall experience was a pleasant one. I went through the instructions and noted all the special tools and supplies needed to do and make the build easier. The tools that are more than worth the cost are a good ring compressor and an oil seal installation tool. I used the cheap engine mount and it worked fine.

There are only a few things that I feel need special attention. The buildup of the crankshaft took two attempts to complete. I followed the instructions and got the cam gear on with no problem then I ended up slightly bending the oil slinger while hurrying to get the key in for the prop hub in the keyway. When I went to put the prop hub on it went about 1/3 of the way and stopped. So after talking to tech support I removed the prop hub with a press.

So the lesson learned, was freeze the crank over night and heat the cam gear in the oven for 3 hours and install it. Then put the oil slinger and prop hub key on the crank and put it back in the freezer for 8 or more hours. Heat the prop hub for 5 or more hours and it goes right on all the way to the oil slinger.

When you prep the case halves check the stud length to make sure they have plenty length for the nuts. When doing the endplay be sure to tighten the gland nut and push the crank back. Also greased the shims when I installed them.

I did not have any clearance problems when I mated the case and torqued everything down. I used Permatex Aviation H3 gasket maker per the plans to seal the case. There are a few kinds of Loctite (272 and 262) that are not listed in the “needed” sections that are hard to find and are a bit pricey. Getting the gland nut torqued was done 2 times the first time I used the required torque divided by body weight equals bar length required to apply the required torque method.

For me it came out to 227/177=1.28 feet. I put a pipe over the wrench and marked it 1.28 feet from the center of the gland nut and put my weight at the mark without jumping on it just lifting my feet off the floor. The second time due to forgetting to do the Loctite I used a torque wrench I got for Christmas. Before I removed the gland nut I checked the torque from hanging my weight and it was right at 230 ft. lbs. The rest of the build and mounting/installing has been done according to the plans and instructions and is straightforward.

I hope this helps others that are getting ready to build an Aerovee.

Robbie Culver

When I considered what experimental airplane to build, one feature that made me interested in the Sonex was the opportunity to assemble my own AeroVee engine. The factory will tell anyone who listens that if you can build an airplane, you can build an engine. After completing my engine, I agree completely. Overall I found the quality of the kit, the step by step instructions, and the actual build process to be excellent and well within the skills of even the most modestly talented builder. (That would be....me)

After we ordered the AeroVee, AeroConversions released the turbo kit - we wanted to add it to the engine during the build to avoid having to do so later.

My wife and I carefully combed through the assembly manual prior to starting to ensure we had all required tools and materials. This helped immensely, and even though we missed several key items that we had to purchase later, having everything ready was a huge benefit. I would encourage anyone preparing to build their AeroVee to do the same. I would also highly encourage reading each and every step prior to performing it, making notes in the manual, and marking what you complete.

I also highly recommend being sure you purchase the correct Loctite - we found one section where the required materials list for a step did not show the Loctite. Specifically where it says to use Loctite 272 on the flywheel gland nut.

Unfortunately for us, this happened during the Christmas 2014 break - which made us nickname the Loctite “unobtanium” since we could not get any. As always another builder, in this case Dana Baker, came to the rescue and sent us what he had left. What an awesome community we have!

I did find some areas of the manual had less specific information about tools and materials required to complete a task than other areas did - in general the manual is accurate and easy to follow. The accessory plate installation steps are one example where we found a missing tool. The tools required list did not include a 6mm open-ended wrench we needed. While this is not a major issue, we quickly learned to double check each section for missing tool or materials before we began that step.

During the crank case preparation, we found several changes in the manual from the video - technical support told us to go with the manual. The video said to use Loctite on one step and the instructions did not mention it. The video also said to use grease where the instructions said to use oil. My point is that when you are uncertain, ask technical support for guidance. In general, we found the video to be a general guide but very old.

During this step, we found it very difficult to compress the oil plunger relief springs. Be patient with this step and ready for some challenges. A bit later, when we came to the step to align the flywheel dowel pins, we also encountered some serious challenges – again, take your time and be prepared for this. It isn't hard, it is just detailed.

When we got to the rocker shaft installation, the build manual had one set of part numbers and the kit had a different set. Again, an email to technical support resolved the question. Personally, I found the rocker arm assembly to be the most time consuming step – a lot of assembly and disassembly was required to get things to fit correctly. Eventually I stripped the nut on one arm and had to order a new set. Go slow, be careful, and check your work closely.

The turbo kit was clearly new to both the company and we had what was obviously an early release kit. We had to "reclock" our turbo, which turned out to be a very minor step. The turbo instructions, which are clearly written and easy to follow, had us install a very small part, ACV-T05-40-01 Retaining Ring on page 17, step 9, only to find we had to remove it on page 18, step 11, when the turbo blanket is installed. The clip is very, very small. Be careful with it – it disappeared more than once on the workshop floor.

Again, a minor annoyance – overall the turbo kit and instructions are excellent. Some steps could use a tools and material list, such as the Turbo Body and Actuator installation steps on page 17. We found that we needed a 10mm, 13mm and 14mm wrench only after reading the steps carefully. The AeroVee assembly manual has detailed tools and material lists in each section. The retrofit manual would be well served to add this.

If you are considering what engine to put in your Sonex, Waiex, Xenos, or Onex, choosing the AeroVee is definitely a good choice. Assembling it is definitely a straightforward process, well documented, and even adding the turbo was not difficult. As a first time builder with moderate skills, I found the build process for the engine easier than anticipated and way more fun than I thought it would be.

While I have not flown behind the engine yet, I am looking forward to it.

“Builders” or “Assemblers”?

Joe Norris

Recent conversations have led me to reflect on how the amateur-built aircraft world has evolved over the years. In order to give some perspective, allow me to offer a bit of history. I built my first “homebuilt” aircraft in the 80s. In fact, it took me an entire decade to finish the airplane, but that’s another story. When I started my project – which by the way was a John Monnett design, the Sonerai II - most homebuilts were still scratch-built, from plans. Yes, there were some “kits” available, but aside from the Christen Eagle, most of these “kits” were actually just pre-packaged materials that saved the builder some time and effort, eliminating a lot of “scrounging”. The aircraft were still primarily plans-built, with the builder(s) making almost every part.

The Christen Eagle was really the ground-breaker. Introduced in the late 70s, the kit was by far the most complete ever offered. It included so many completed parts that the FAA had to take a close look in order to make sure the kit still met the “major portion” (aka “51%) requirements for amateur-built certification. The Eagle kit was the reason that the FAA first developed the amateur-built fabrication and assembly checklist. Many builders, and potential builders, of other designs looked at the Eagle and asked “why can’t our kits be like that?” Being a market-driven industry, the kit aircraft industry responded.

A late friend of mine had a saying; “Progress was a good thing. It just went on too long.” He wasn’t talking about the kit aircraft industry, but his words are spot-on. Customers looked at the Christen Eagle and asked for more complete kits from other vendors. Some vendors responded, and then customers of still other vendors asked why their kits weren’t keeping up. So those vendors responded. Then the original vendors responded by making their kits even more sophisticated. The snowball was rolling down the hill, picking up momentum, and finally crashed into the tree called the “51% rule”. Now we have very complete “quick-build” kits from nearly every major vendor, taking their designs right up against the FAA limit for amateur-built certification.

But what has this evolution done to the homebuilt community? As kits have matured, less and less parts and components required fabrication, and more (or sometimes less) components became an assembly operation. Unfortunately, this has led to many customers asking for (demanding) even more components be completed, which in turn reduced fabrication even farther. All this has reduced the amount of real building skill and knowledge required of the builder, and has opened the door to customers who really don’t want to be builders at all, but rather want a “big model airplane” to assemble. They want to be “assemblers” rather than “builders”. As with many other segments of our modern society, “craftsmen” are disappearing from the world of amateur-built aircraft.

Much as some “builders” would like it, fabrication cannot be completely eliminated from the process. The FAA specifically requires that there be some fabrication tasks included for the builder to accomplish in order for the aircraft to qualify for amateur-built certification. Also, the regulation for amateur-built certification also states that the builder must gain some “education” during the process of constructing the project. It is the learning of these fabrication tasks that offers a good share of that education.

The Internet is not our friend in this endeavor either. The proliferation of Internet connections, email, instant messaging, wifi hotspots, and smart phones and tablets has created an “instant gratification” society. In general, people don’t want to have to wait for anything, and don’t want to take the time to learn something when they can just fire off an email and get an answer. This wasn’t the case back when I built my Sonerai. We had to read books, go to EAA chapter meetings, attend forums at the EAA convention, and even actually write letters in order to find the info we needed. (This is just some of the reasons why it took me over 10 years to build my plane.) Now, rather than even think about cracking a book, many builders will just grab their smart phone and fire off an email. Many times, the person on the other end of that email will simply look something up on the vendor’s own website, or even use our friend “Google” to find the answer. The person who sent the email could have easily found this info using the exact same methods, which probably would have resulted in them having the info even faster than waiting for the response to the email, but they never even gave it a thought. It’s easier just to hit “send”.

Doing things this way takes time for someone on the vendor’s end to do the research and put together the reply. Time costs money, which ultimately helps drive up the cost of the kits and components. One of the perceived benefits of building one’s own aircraft is to make aviation “affordable”. Taking time to do your own research, using the many tools available to you in this modern world (including those books and EAA chapters and Tech Counselors), will help to keep it that way. Don’t be the guy who sends an email one-liner from his smart phone - “I drilled a ¼ inch hole and I can’t get an AN5 bolt to fit”.

I’ll let you do the research on that one!