
SNX-X18
SNX-X14
Forward Wing Ribs
SNX-X15
Release Date
01/18/05
05/17/05
09/25/09
05/09/13
Dash Number
Quantity Required
Part Title
Next Assembly
sonex
Drawing Tree - Builder's Seminar
Revision
A
Drawing Scale
none
Drawing Number
SNX-X01

TABLE OF CONTENTS

What a Sonex Summer! 3
Some Thoughts on Transition to the Sonex 5
Thoughts on Phase 1 Operations 7
Is the Waiex a Cross-Country Machine? 11
AeroVee Oil Pressure Modifications 25

SHOP TALK

THE NEWSLETTER OF THE SONEX BUILDERS & PILOTS FOUNDATION
November 2013

What a Sonex Summer!

Robbie Culver, President - Sonex Builders and Pilots Foundation

There won't be many years like 2013 for the Sonex Builders and Pilots Foundation! After our incorporation in May 2013, the summer began with a flourish of Sonex-related activities. From first flights to Oshkosh to Crossville, it was indeed a Sonex Summer.

What began as some online conversations between Mike Farley, Eric Seber, and I about possibly forming a type club for all Sonex Aircraft, LLC models turned into a reality in May 2013. We scraped some money together, found a lawyer to help us form a not-for-profit, and started laying out the basis for what we did and did not want to do. We also knew we had to offer something tangible for anyone to take us seriously (or as I put it initially, to gain "street credibility").

Timing is everything. As we decided an initial project could be a transition training document, and began work on creating it (Mike Farley - thank you!). I approached Sonex Aircraft LLC with the idea of the type club and a transition training document. Sonex Aircraft liked the idea. As it turns out, Joe Norris had just been hired with one of his assignments being....a transition training program. So our idea became a joint document, reviewed by and released with Sonex Aircraft, LLC. The T-Flight program began right as we completed the document, and if you read Joe Norris' article later in this newsletter, it has been a resounding success!

And off we went - we bought a domain name, opened a GoDaddy account, and launched an online presence with the transition training document, a lot of photos, and a lot of potential. I don't think any of us really knew if our idea would fly in the Sonex community, or how long it could take to attract members. To our delight, the member submissions and sign-ups began pouring in.

As member submitted material began to appear in our email inboxes, we posted more and more content to sonexfoundation.com. While we continue to ask for contributions, we are very satisfied with the progress and content we have so far.

June saw the first annual Great Lakes Sonex fly-in at Clow airport in Bolingbrook, IL. While the weather was a bust, the event sure wasn't, and I look forward to seeing it grow and flourish in years to come.

In July, I had the honor of witnessing (and photographing) a Sonex first flight. My friend Jim Reichard completed an 8 year build of a Jabiru 3300 powered conventional gear Sonex and departed the Hinckley, IL airport on July 20th. As I am about halfway through my build, this was as inspirational as it gets. Jim has been a source of knowledge, a cheerleader when I get the builder blues, and a great friend all around.

AirVenture Oshkosh brought the factory open house and reunion, and our first annual membership meeting, held on the flightline in Oshkosh with the Sonex booth behind us, and a line of Sonex models tied down in front of us. We are required by law to hold a public meeting, and it doesn't get much more public than that.

Seeing the Sub Sonex jet in person, and then seeing it fly, sure made me realize how far experimental aviation has come since I was a kid. It was Oshkosh (it wasn't AirVenture then, and I am not sure it ever will be to me) that was the inspiration of the dream that led to me buying Sonex kit 1517 in 2011.

And then there is Crossville....

The entire board of directors of our foundation, plus the treasurer, were in attendance and we staffed a booth in the hangar, as well as showing a presentation about the foundation after lunch on Saturday. I was mildly surprised at the number of Sonex people who had never heard of us.

If you have never been to the American Sonex Association (ASA) fly-in, make plans now for next October. I first attended in 2012, and it sent me home all fired up to complete my wings, which I did over the winter.

This year was the 10th anniversary, and 40 aircraft flew in, with just about every possible combination of engine, propeller, and modifications you could imagine. I can't imagine how satisfied John Davis felt after having airplane number 40 arrive, but I saw the grin on his face - it spoke volumes. Congratulations John and all the staff that volunteers to put the fly in together!

Some Thoughts on Transition to the Sonex

By Joe Norris

Having spent the summer giving transition training to Sonex builders, potential builders, and buyers, I have found that there are some universal truths in the world of Sonex. I hope you will find the following musings to be both illuminating and entertaining. (NOTE: These comments apply equally to Sonex, Waiex, and Xenos airplanes, so I'll just use the term “Sonex” universally.)

Truth #1 – Nobody goes away disappointed! I have flown with high time pilots, low time pilots, builders who are preparing to fly their completed airplanes, pilots who have just purchased a flying Sonex design, and potential customers who are contemplating what airplane they might want to build. In every single case the pilot has a big smile at the conclusion of their training. Not one single person has found the airplane to be less than they expected.

Truth #2 – This ain't your father's Cessna (or Piper, or Beechcraft, etc.) Pilots who's sole experience has been in general aviation aircraft have found the Sonex to be a whole new world in control feel. It takes a while to get comfortable with flying the airplane with JUST the fingertips. You don't have to hold on tight when the control pressures are light and the airplane is responsive. This is probably the steepest learning curve I've run into. Pilots who have flown light-sport aircraft, or have experience in other homebuilt designs are better prepared to get in tune with the Sonex' responsive handling.

Truth #3 – This thing is LOW to the ground! Everybody has a tendency to flare too high at first. The Sonex designs sit quite a bit closer to the ground than a typical GA airplane, and they respond to control inputs more promptly than most GA airplanes, so pilots need to learn to fly the airplane down closer to the runway before starting their flare, lest they want to run out of energy before they run out of altitude. (We all know the result of that situation!)

Truth #4 – Speed control is king! As a follow on to the previous truth, a good landing will follow if the pilot

flares at the proper height above the ground AND at the proper speed. Just a couple of extra MPH of airspeed will result in a prolonged float before touchdown. And as we all know, the longer you float down the runway the longer you have to screw up what could have been a good landing. With proper speed you will get a nice round-out, flare and touchdown in short order. Most pilots tend to fly their final approach too fast. Slow the danged thing down!!

Truth #5 – That long, sloping windshield and long glare shield make for an interesting sight picture. This is a multifaceted truth. First, since the Sonex is a side-by-side airplane and the pilot is sitting off center, the sight picture for a left turn is much different than for a right turn. This is of course true of any side-by-side airplane, but the unique windshield of the Sonex seems to accentuate this difference. As a result, every pilot I've flown with has a tendency to lose altitude in left turns and gain altitude in right turns when sitting in the left seat. (This is reversed when the pilot is sitting in the right seat.)

It takes a while to get used to the very different location of the horizon in the windshield for left turns versus right turns. Also, the unique sight picture messes up your landings too. The airplane tapers from your shoulders to the nose, and the two “break” lines in the glare shield also taper toward the front. This gives pilots a false signal as to what “straight ahead” is, which results in pilots trying to land the airplane with the nose cocked off to the left when sitting in the left seat (or off to the right when sitting in the right seat). Pilots need to really study what “straight ahead” looks like when taxiing out for takeoff so that they know how to align the airplane with the runway at touchdown.

Truth #6 – This is an “attitude” airplane. Once the pilot gets the right sight picture in their mind for level flight and level turns, the instrument panel becomes largely unnecessary and possibly a distraction. When I find pilots spending too much time looking at the panel I'll simply cover it up. In every case the pilot will end up being smoother when flying the airplane by looking outside. The airplane “talks” to you. What you see, what you hear, and what you feel will tell you everything you need to know about what the airplane is doing. The panel is mostly just for a quick check every once in a while and an engine monitor. Look outside!!

Truth #7 – The difference between a Sonex and a Waiex is the shape of the tail. That's IT! There is no discernible difference in performance, handling, or stability. When you're sitting in the cockpit flying the airplane you can't tell which tail is on the back. They all fly the same. It's ALL about the look!

Truth #8 – No matter how hard you push on both rudder pedals, the brakes don't work! Years ago there were quite a few airplanes that had hand brakes, but most “modern” pilots haven't had any experience with them. It takes the pilot a little while to quite pushing on the pedals and reach for the brake handle to get the plane slowed or stopped. It's a good idea not to put yourself in a situation where immediate braking will be necessary until the hand brake has become second nature.

Truth #9 (the ultimate truth) – There's no replacement for experience! By all means, before you fly a Sonex yourself get some time in one. Take advantage of our factory transition training, get together with other transition training LODA holders around the country, or get some stick time with another Sonex owner. This will be time well spent and will prepare you to fly your new airplane.

Be safe!

Thoughts on Phase 1 Operations

by Michael Farley, Waiex 0056

Finally! The task is complete! You have taken a large collection of pieces and parts, and assembled them into a complete, finished airplane. Not only that, but you completed the project by going through all necessary paperwork and have just been issued your new Airworthiness Certificate from a DAR, or representative of your local FSDO. This is truly a magical moment and one to be cherished.

Now that you have a complete, certified airplane, let me ask you a question: have you thought about what happens now? Most people would eagerly answer that question with a yes, and respond to my question with a barrage of names of friends they want to take for an airplane ride, or trips they've been planning on taking once the airplane is finally finished.

But how about the first few flights? How about the restricted testing phase, known on your new Operating Limitations as Phase 1?

As it turns out, most builders and pilots of homebuilt airplanes are no strangers when it comes to Phase 1 limitations, and chances are the inspector of your airplane spent a lot of time discussing this testing phase by addressing how long you need to fly in Phase 1, where you are limited to flying during this time, and how to complete this testing time. One important item that may not get addressed quite as much, however, is what steps are to be completed throughout the actual Phase 1 flights. It seems that a lot of questions are left unanswered, and a lot of the requirements are, dare I say it...a little vague?

If I may, allow me to try and help in this matter a little bit. The good news is a lot of the answers we need are there if we spend a few quick moments digging for them.

One of the first things I recommend you take a look at is your official Operating Limitations that were issued at the same time your Airworthiness Certificate was issued. These Operating Limitations give a lot of very helpful information and do a nice job of spelling out what your specific rules and requirements are during the Phase 1 test time. Oh, one thing to note; don't forget that these Operating Limitations must stay in your airplane at all times, even after the Phase 1 test time is completed. I laminated mine so they'll last much longer!

In your Operating Limitations you will find a few specific requirements for your airplane. For instance, the limitations will be very specific in the minimum number of hours you will need to keep your airplane in Phase 1. In most cases, it's fairly simple; if your engine and propeller combination has been certified in a production airplane, you may only need to perform a Phase 1 of at least 25 hours. This may apply to certain homebuilt airplanes, such as my father's Wheeler Express kit plane. His engine and prop were certified together on the Rockwell Commander 112, and as a result his Express only needed to be in Phase 1 for a minimum of 25 hours. To the best of my knowledge though, no Sonex, Waiex, Xenos, or Onex has a certified engine and prop combination, so most likely everyone has been and/or will be assigned a 40 hour Phase 1 time.

Your Operating Limitations should also specify the geographic area where you are limited to during Phase 1. A few important items to note; this geographic area does not need to be centered on your home airport, and the size of this area can be tailored to suit your individual requirements. In my case,

the FSDO inspector asked me prior to my inspection if I had a preference on a suitable testing area, and we agreed to create a 75 NM circle around an airport around 30 miles from my home airport, thus providing me with a large, unpopulated area to complete my testing.

Finally, your Operating Limitations should also restrict you to daylight flying only, in VFR conditions, and only with required crew members for your airplane. I know of several people who have taken a second "required crew member" along for record keeping during their Phase 1 flights, but I would strongly caution you against this practice. It might be much safer to mount a camera and record your flight to obtain needed data.

Now that we know some of the restrictions to uphold during Phase 1, let's now think about what our game plan will be once we finally get in the air. After all, the only thing that states the owner/operator is complete with Phase 1 is a simple logbook entry that should read just like this:

“I certify that the prescribed flight test hours have been completed and the aircraft is controllable throughout its normal range of speeds and throughout all maneuvers to be executed, has no hazardous operating characteristics or design features, and is safe for operation. The following aircraft operating data has been demonstrated during the flight testing: speeds Vso _____, Vx _____, and Vy _____, and the weight _____ and CG location _____ at which they were obtained.”

But how do we get there? What maneuvers do we need to accomplish to prove that our airplane is safe? To answer these questions, I highly recommend you do the following two steps:

First, find an EAA approved Flight Advisor who is able to help you transition into your new airplane. The EAA Flight Advisor program is designed to help pilots with training and familiarization into their new experimental airplanes, thus promoting safety.

Read more information and look for a Flight Advisor in your area by following this link:

http://www.eaa.org/flightadvisors/

Second, download, print, and read the FAA AC 90-89 which you can find here: http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/23127

This wonderful bit of information is written to help create a plan for your aircraft flight testing. Included in this advisory circular is information regarding who should perform the initial test flying, which airport to choose, and how the airplane and engine should be prepared and tested prior to the actual first flight. One pointer you will read time and time again is what to do in the event of an abnormal or emergency situation; if anything unplanned occurs while on a test flight, remember you have one response: "FLY THE AIRCRAFT!" I believe this to be the utmost in importance for test pilots to remember as they perform flight testing, so always remember, "FLY THE AIRCRAFT!"

I'd like to share with you a quick story of my Phase 1 testing procedures as I accomplished it on my Waiex throughout the spring of 2012.

My Phase 1 Experience

"Union County traffic, Experimental 569 Kilo Mike is taking runway 9 for takeoff."

I vividly remember these words coming out of my mouth on a beautiful spring evening, April 2nd, 2012. On that fateful day something truly magical happened to me. On that day, I was successfully able to complete the first test flight of my homebuilt airplane, a Sonex designed Waiex kit plane.

I slowly taxied onto the centerline of the runway and performed one final check of all engine and flight gauges. Since I installed the MGL Stratomaster Ultra XL EFIS display in the middle of my panel, this scan only took a few seconds. I slowly advanced the throttle all the way forward, and was rewarded by

the surprisingly powerful pull of the AeroVee engine up front as the RPMs slowly wound up to just over 3000. I could both hear and feel this awesome little airplane come to life right before my eyes.

All of those parts and pieces I had purchased over two years ago were now a complete, fully functional airplane, ready to defy gravity and slip the surly bonds of earth. All of those hours of cutting, drilling, de-burring, riveting, and painting flashed in my mind, and in that instant, I couldn't help but smile as I knew those days had drawn to an end.

I held full back stick to keep the tailwheel on the ground, thus providing direct steering control as the speed quickly built. After only a few seconds a quick look at the airspeed indication showed I was already nearing 50 miles per hour and accelerating rapidly. By this point, I knew I had positive rudder authority so I slowly relaxed the back pressure and to my surprise, the airplane departed the ground in nearly a three point attitude. Oh my gosh, this thing actually flies!

One concern I had on the first flight was the possibility of a hot running engine, mostly due to the fact it had not yet been broken in. With this in mind, I had preplanned to climb initially at around 80 miles per hour, then after reaching around 500' above the ground, I wanted to transition to more of a cruise climb of around 100 miles per hour. By following this plan I was fortunate enough to keep all of my cylinders at or below 400 degrees, which was my primary goal. As I continued this cruise climb, I took a few seconds to ensure that I had control of the airplane by immediately testing aileron, elevator, and rudder control pressures and authority. Thanks to the wonderful design produced by Sonex Aircraft, everything was working perfectly!

By having my airplane based at a country airport in central Ohio, I have the good fortune of having plenty of emergency landing strips in the form of corn and bean fields. Not wanting to tempt fate, however, I decided that for the first few hours the Waiex flew, I was going to stay immediately over my home airport. With this idea in mind, as I reached my initial cruising altitude of around 2000' above the ground, I began a shallow bank back towards the airport itself, thus entering a big figure 8 pattern over the field. I allowed the engine to wind up and then slightly reduced the power, settling in at around 3100 RPM for the initial break in. By this time I was fully convinced the airframe itself was fully controllable and behaving normally, so the majority of my attention was focused on the engine readings. By some good fortune the AeroVee was performing flawlessly as it quickly took me in my racetrack pattern over the airport.

After 25 minutes of flying I felt I had accomplished enough for the first flight, so a slight reduction in power started me back towards the traffic pattern. I was happy to note that this also cooled the engine slightly, providing me with an added safety margin just in case I chose to perform a go around on the landing. I slowly entered the downwind leg and performed the standard GUMPSS check, then began reducing power once I was abeam of my landing point.

After adjusting the elevator trim to reduce any stick pressure, my airspeed was already bleeding below 100 miles per hour so I added the first notch of flaps, then adjusted the pitch to establish a descent at 90 miles per hour. Once the runway was at the standard 45 degree angle behind the wingtip, I made a gentle turn to base and adjusted the power to hold my descent rate.

All was looking good as I made the turn to final so I chose to keep the flaps at the first notch for landing, which is a 10 degree deflection.

My goal was to cross the end of the runway at 80 miles per hour which I knew would result in a float, but with over 4000' of runway available this wasn't a concern. I wanted to make sure I had plenty of energy for the flare. This worked out perfectly as I slowly closed the throttle, brought the nose up to my best estimate of a three point attitude, and waited. I didn't have to wait long to hear the satisfying chirp as all three wheels gently touched down at the same point, approximately 1000' down the runway. Stick slowly back and gentle braking brought the speed down to taxi speed, at which point I was able to exit the

runway around the midfield turnoff.

I had done it! I had not only built an airplane with my own two hands, but I flew it as well! Not only that, but this awesome little airplane flew wonderfully! What a fun day that was.

After coming down from an emotional high, I took stock of the flight and all that happened during my time aloft, both good and bad. I knew right away that the Waiex was flying normally and seemed to fly coordinated, with almost no "heavy wing" issue. Most electronics seemed to function normally, with a few small exceptions.

First off, as I was flying over the airport, my electronic oil pressure gauge was displaying a wide range of oil pressures throughout the flight. The average seemed to fall into the middle of the acceptable range so I felt comfortable to continue, but I knew I wanted that gauge to read accurately and reliably before I continued testing the airplane. I also noticed that my radio was working properly and I could hear other aircraft talking, but it seemed to have a somewhat limited range and received at a barely acceptable level. Finally, like several others, I was getting a less than smooth brake pulse when I applied the mechanical brakes.

Before the next flight, I performed a complete inspection of the airframe to ensure nothing had broken or rattled loose. I paid special attention to the engine compartment to ensure there were no leaks, drips, or errors which could become a big issue later on. After finding no other issues, I went to work on fixing these few little problems in preparation for another test flight.

First, I took my wheels off the airplane and ensured the mechanical brake backing plate was at the correct angle in comparison to the gear leg axle. I also used this time to shave off some of the brake material off the brake shoes, thus allowing me to reinstall the wheel and not have any dragging issues when I spun the tires. As for the oil pressure, my first step was to run a dedicated ground wire from the oil pressure sender body to the engine block itself, thus ensuring a good ground. I also took this opportunity to re-torque my propeller bolts as specified in the propeller manual.

After buttoning everything back up, I felt the airplane was ready for a second test flight. I decided that, for the time being, the radio was working at an acceptable level so flight testing could continue. Test flight #2 was virtually a repeat of the first flight and found me performing my standard oval pattern directly over my home field. This flight was also kept fairly short; after flying for around 35 minutes I slowly let back down into the pattern, and was once more rewarded with a smooth three point landing. The brakes, while still not perfect, were much better, as was the oil pressure reading which seemed much more accurate after adding a ground wire. By this time I had amassed a total of just over 1 hour total flight time, so it was time for some regular engine adjustments in the form of an oil change and a valve adjustment.

Over the next several flights, I was able to gain a comfort level with my new airplane while making several small adjustments on the airframe and engine. First off, I wanted to take appropriate steps in keeping my engine cool during this initial break in period. I was fortunate by performing my initial flights in cooler, springtime temperatures which helped keep my cylinder head temperatures from reaching redline, but they were still running hotter than I preferred. In order to help cool my engine I modified my cowling by enlarging the cooling exit area, which helped increase airflow. Ultimately I enlarged this exit area 40% more than the specified plans which helped my engine to run at cooler temperatures.

By the time I reached 5 hours of flight time on my Waiex, I was well into the testing regime and everything was working normally. The airframe was proving to be nearly perfect with almost no trim adjustments necessary, and the AeroVee engine was running very well as I continued breaking it in. One adjustment I decided to complete was the relocation of my radio antenna from on top of my instrument glareshield to the top of the fuselage, right behind the canopy. This change had a drastic effect on the

clarity and range of my radio as I could now easily communicate with other airplanes well over 100 miles away. I also took this opportunity to install a mechanical oil pressure gauge into my panel to supplement the digital oil pressure readings that were still slightly erratic. The inexpensive mechanical gauge has proven to be 100% accurate and has been an excellent addition to my panel.

After reaching 10 hours on the Waiex, I decided to perform a "mini conditional inspection" on the entire airframe to ensure all was in order. This provided no surprises or abnormalities, so everything was reassembled so testing could continue. Once this inspection was completed, I had the confidence in the airplane to begin leaving the vicinity of my home airport to test for cruise speeds, fuel burns, and other necessary testing items.

Once I reached 35 hours of flight time, I had accomplished most of my necessary testing maneuvers and goals. The airframe and engine were proving to be very reliable and engine temperatures were stabilizing in normal temperature ranges. One final adjustment made to the engine at this point was a check of the secondary ignition which led to the discovery that my secondary ignition was slightly advanced. After making appropriate adjustments I was rewarded with an engine that not only ran cooler, but seemed to gain a slight amount of power as well.

Almost exactly two months after my first flight, I finished the Phase 1 testing on my Waiex. By this time I was completely confident that I had built a strong, safe, and reliable airplane that was properly adjusted and safe to sign off. After completing the necessary log book entries, I was able to celebrate the occasion by taking my wife up for her first ride.

Shortly after, I was able to fly my airplane to Oshkosh for the AirVenture airshow, but that is a story for another day.

Is the Waiex a Cross-Country Machine?

Written by Kip Laurie, Waiex 82, Reg. N111YX

I'm not sure where my desire to fly coast to coast originated. It's been done thousands of times so it's not about originality. But, how many have done it in their "homebuilt" creation? That may be the difference in earning a spot in a special club. Coast to coast navigation of the USA by small aircraft is now a century-old practice but the undertaking still guarantees, at the very least, some adventure and that's all the reason I needed. Honestly, I likely did it because I simply enjoy seeing how far I can go and what's around the next corner. I've learned that I dislike borders and I feel a bit sorry for pilots in tiny countries.

Reading FLYING magazine every month as a kid, mesmerized by flying machines and interesting destinations, I realized early that airplanes are expensive and recall saving my allowance for a Bonanza. I suppose my interest of interstate travel originated in the dreams of that V-tail. I even recall planning the stops required for a trip to Europe! Thankfully, I could never afford the Beech as the cost would be triple that of my homebuilt and offer only a fraction of sense of accomplishment. After building a Kolb Firestar in 2000, I had seriously considered a low and slow coast-to-coast trip by ultralight-type aircraft. Adventure comes easy in short hops in a 368 pound airplane so crossing the country would be the ultimate! Speed was not a big issue or, so I thought. Over a couple of years of informal planning and real world operations with the Kolb, I resigned that it was never going to happen at 55 mph until retirement. I'd have to budget months of time for weather and logistics.

Years later, I was ready to build again and I completed my Waiex in May 2010. While enjoying a 100 mph advantage over the Kolb, multi-hundred mile flights became routine. Within 11 months after the first flight, I had been to 16 states, trips to Oshkosh and Sun n Fun, as well as a dozen pancake breakfasts. I learned about the little, yet significant things that are required when traveling in a 700 pound airplane. Packing light, having good tie-downs, coping with no cabin heat, airframe leaks in the rain, selecting airports with runways aligned in the wind, and knowledge of the best internet radar websites proved essential. In May of 2011, the airplane was ready, my work schedule opened up, and the weather looked decent so a 30 year old dream was suddenly within reach. Yes, it's risky, takes time and money, but you only live once and can't take it with you and all that. I was about to fly from Kitty Hawk, North Carolina to Catalina Island, California within 25 days in my homebuilt airplane that ironically resembled my once-desired Bonanza (at least in the tail area).

It all began when I noticed an online ad for the Virginia Festival of Flight in Suffolk, VA (SFQ) in early 2011. A quick look at the Charlotte sectional chart showed that Suffolk was relatively close to Kitty Hawk, NC. I'd always wanted to take the obligatory picture of my airplane with the Wright Monument in the background. However, the distance from my home airport near Atlanta to Kitty Hawk makes for about seven hour round-trip which is a bit too much flying time in a single day to be enjoyable. The fly-in at Suffolk was the perfect excuse to pack a tent, spend the night at the show, fly to Kitty Hawk the next day, then have an easy return flight home. I departed my home airport, Monroe, GA (D73) on April 30th, 2011, stopping in Laurens County, SC (LUX) and Louisburg, NC (LHZ) for fuel.

Despite performing a minor ground loop in a 90 degree gusting crosswind (there's my ONE, right?), and destroying my ventral fin by dragging my tailwheel into a pothole at Suffolk, I had a great time. I caught up with good friends and enjoyed the day talking with the many admirers of my airplane with details and pride that only a homebuilder could. The next morning, I awoke at sunrise with anticipation and packed my dew covered tent in the back of the Waiex. The flight to Kitty Hawk offered stunning sunrise views of the Atlantic and familiar coastline shapes subconsciously memorized from a lifetime of map reading.

After successfully dodging deer on the runway while landing at First Flight Airport (FFA), I paid my respect to the Wrights with a hike up to the monument and then a flight around the area to record the experience for YouTube. After completing a loop, roll, and spin over the Atlantic, the "East Coast" was checked off. Heading home, I made the quick, six mile jaunt to Manteo, NC (MQI) to top off with fuel as

First Flight airport amenities are basically a runway and a small AOPA-sponsored building to check weather. That was just fine. For once, it was nice to take in the peace of park rangers, visitors, and wildlife instead of the beeping sound of a fuel truck in reverse. After about four hour's flight time, I was back at home eagerly investigating the regional weather traits for an opportunity to go west. One concern was making the trip early enough in the year before the southwestern temperatures punish pilots operating with greenhouse-like canopies. In hindsight, I gave relatively little thought to the power of the spring weather systems.

It would be 21 days before I had the opportunity to continue the trip. Working for a living got in the way. Two days after leaving Kitty Hawk I was in Germany on a business trip and in the following two weeks I visited Teterboro, NJ, Washington DC (Dulles), Charlevoix, MI, and finally Orlando. Finally, there were no more hurdles on the (immediate) horizon and it was time to head west.

Day one; at sunrise on May 22, 2011, I departed Monroe on the east side of Atlanta for a 25 minute flight to meet my wingman, Joerg, at Peachtree City Airport (FFC), on the other side of Atlanta. Joerg, who just purchased his 1988 VariEze only a few months before said "oh, why not?" when asked if he wanted to go along. Being a low time pilot, (90 hours, 5 in type) he was about to get some real cross-country indoctrination. The plan for the day was to fly west until we ran out of light with the general goal of being in Las Vegas at the end of the second day. Fortunately, we made for a good match speed-wise. Joerg has Burt Rutan to thank for the fact his little C-85 powered Eze is slick enough to run neck and neck with my 120 HP Jabiru six cylinder. Had he installed his yet unpainted wheel pants for the trip, I would have never been in the lead.

I taxied up to Joerg's hangar as the fuel truck was driving away and witnessed his pre-start ritual. The VariEze has no starter so it goes like this; lower the Eze on its nose, chock it with ropes tied to the chocks, ignition off, prime, walk around to the back, pull eight blades through, walk back to the front, ignition on, walk back to the back, hand prop it, walk back to the front, lift the canard, lower the nosewheel via a crank, get in the airplane, hold the brakes and pull the chocks via the rope. In the Waiex, I get in and hit the starter. It seemed that some pilots would be working harder than others on this trip! On our first takeoff together on Runway 14, I led by about 15 seconds and quickly turned away from the blinding sun. Joerg soon called on the radio to say that he lost sight of me. I began circling looking for him. After flying three complete circles trying to find each other we were finally on our way to Tupelo, MS (TUP). Not exactly a silky smooth start. An hour later at 6,500 feet, we observed surreal scarring of the Alabama forests where the "Tuscaloosa" tornado outbreak a month earlier clawed its way northeast. Later that day we would have our own brush with another historic weather system.

Tupelo served up our only weather delay of the trip. Low intensity showers to our west moving east caused us to push the airplanes into a hangar and have a long lunch. By the time the precipitation reached the airport, it had fizzled into harmless sprinkles but cost us a couple hours. After takeoff, I tried to spot the Elvis Presley birth home where I paid a dollar to visit many years ago. Unable to find it we set course to Hot Springs, AR (HOT). I should admit that the reason for two hour legs was my fault. The Waiex carries only 16 gallons of fuel equating to about 2 hours 55 minutes until dry or, about 300 miles. The VariEze can fly for six hours!

At 6,500 feet over Mississippi, the smooth morning air allowed us to settle in, get our iPods configured, and allow us time to ponder what in the world we were doing. Our itinerary was minimal; the California coast or bust. If the schedule allowed, I wanted to also stop in Las Vegas to see a good friend of mine and Joerg wanted to hop over to Mojave to strut around in Rutan Country with the Eze. And, if the weather was good and nobody broke down, perhaps we could go all the way to Catalina Island. The consensus was to evaluate the Catalina part if and when we actually arrived anywhere close the Pacific Time zone.

An hour and forty five minutes later, we found Hot Springs humid and with a ragged 1800' broken layer. Throw in four miles of visibility in haze and things were getting a bit tight for VFR in mountainous terrain. After fueling up and killing time by looking the airplanes over for oil leaks and missing parts, it began to look somewhat brighter on the west horizon so off we went. While climbing around the rapidly building afternoon cumulus it became uncomfortably difficult to maintain ample cloud clearances.

The thought of clear, dry desert skies a few hundred miles ahead was our inspiration as we struggled to reach the top of the haze layer. Finally on top at 12,500', the murk below began to fill in creating a nearly solid undercast. Our destination, McAlester, OK (MLC) was forecasting clear all day but that was an hour and a half away. With my small fuel tank, I felt a bit uneasy as I could see a classic "VFR stuck on top" scenario unfolding if the forecasters were wrong.

I looked at the VariEze off my wing, jealous of its ability to fly hundreds of more miles than me. I also had plenty of time to ponder how long the descent would be in the clouds after an engine failure and using my single EFIS horizon to keep the wings level. It would be a long time! I thought really hard about a 180 degree turn but up ahead I could see the clouds breaking up again so we pressed on. Soon, I was relieved to see a scattered layer as forecast and clouds would not be a factor for the next 3600 miles to the Pacific and all the way back to Georgia.

McAlester provided a warm-up for a concern common to all of the southwestern stops; high surface winds. As the lone taildragger pilot on the trip, I would like to congratulate and thank the airport designers in the west for aligning the runways into the prevailing winds. Despite 20-30 knot winds at almost every stop until California, rarely did the wind direction differ more than 20 degrees from an

available runway. That little gift kept us on what little schedule we had by not requiring diversions to alternate airports. I should add the Eze was not bothered by such wind near to the level my “Y” tail equipped machine. Winds were 25 knots right down the runway at McAlester. Good.

Norman, OK (OUN) looked like a good place to spend the night as it was an easy score for a free hotel room. Because of our professions, Joerg and I spend considerable time in hotels and between the two of us we had about a half million Hilton points. Therefore, we did not plan to spend any money on hotels for the trip as long as we stayed at a Hilton property. During the 48 minute flight to Norman, increasing haze, continuous turbulence, and headwinds began to take their toll from a fatigue standpoint. It was the last leg of the day and the mileage countdown was like watching a clock. Twenty miles from Norman we penetrated a “dry line” of sorts and the visibility went from six to about 50 miles and the humidity dropped instantly. After landing we looked east and saw one of the most ominous “walls” of towering cumulus clouds I had ever seen from the ground. As it turned out, this was the western edge of the Joplin tornado system. We had squeezed through just before it became a solid line from northern Texas to Western Illinois. More than 150 people had died in the previous hours. We were glued to the TV news channels that night trying to grasp how we could have been enjoying the skies so much while at the next state over others were experiencing hell from it.

Day two; awake at sunrise, I was looking forward to some desert flying. The Southwestern sky and terrain has always been of interest to me after making many ground-bound trips. The wide open spaces are like an aerial playground not found in Georgia. Flying low around the Peach State either amounts to violating a regulation or attracting the wrong sort of attention from a property owner. This was the day that I was to finally do some real desert flying! We returned the nice late-model van that the OSU students at the FBO had given us for the night despite buying relatively little fuel. Our little machines just don’t use a whole lot.

After two hours of flying, Amarillo, TX (AMA) was under the wheels. Just a short walk from the FBO, we found some good enchiladas at the “English Field House” restaurant. Go figure. We were supposed to be further west by lunchtime to make Vegas by the next day and thus running a bit behind schedule so I politely asked for the check as the food arrived. Given a 13,502’ runway, it was an easy decision to request an intersection takeoff as my tightly-cowled Jabiru cylinders heat up quickly on the ground. This

saved the equivalent of five landings worth of tire wear and four minutes of daylight. We would need that four minutes later that day.

We picked up Route 66 to Tucumcari, NM (TCC). Who cannot stare at that two lane road without thinking of all of the life stories it has been a part of? I broke off for a looser formation to take it all in and not worry about colliding with the VariEze. It was interesting to see how the designers dealt with the terrain while cutting the route and similarly, the designers of the intertwining Interstate 40, many years later. Visibility was 75 miles and it made for some extraordinary “big sky” flying.

It was all that I’d hoped for. Despite an occasional antenna, there was nothing to hit and no one to care. Approaching Tucumcari, the AWOS machine indicated potential drama by reporting surface winds near 30 knots. Thankfully, both runways were open and the crosswind component was minimal, allowing for another smooth landing. The “roundtable” fueling area was the first of its kind I had seen, very functional and efficient sort of like a roundabout.

We continued along Route 66 towards Albuquerque and agreed that Double Eagle Airport (AEG) was preferred over Albuquerque International to avoid long taxi distances and high fuel prices. Crossing the Sandia mountain range was memorable as Approach control had us clear the ridge by what seemed like only 500 feet. We experienced a bit of “ground rush” effect from rapidly rising terrain then the reverse as we crested to the sight of sprawling Albuquerque below. For desert pilots, this is probably just another day. For those based east of the Mississippi, this is another planet, with another planet’s weather.

It was tempting to catch a nap in the air-conditioned pilot’s lounge but after studying a map of the USA in the flight planning room it was shocking to see how far we still had to go. Instead of high surface winds, we found ourselves confronting a new nemesis: dust. Military Blackhawk pilots had come to Double Eagle to practice in desert conditions simulating Middle East operations and were naturally parked downwind of the man-made dust storm. This, combined with a few passing dust devils covered our birds in grit. The helicopter pilots walked over to check out our “EXPERIMENTALS” and with their compliments about our machines we headed west without concern about how shiny we were. Not surprisingly, soon after departing Albuquerque we conceded that due to unrealistic (formerly optimistic)

mileage versus speed calculations, Las Vegas by sunset was impossible. Whenever I began to feel stressed by the collapsing schedule I reminded myself that it was a vacation after all.

I thought Sedona, AZ would be a wonderful alternate. Its runway is atop a mesa which looked like fun landing and surely there was a nice Hilton there. We bumped up the speed a bit but could only make it as far as Winslow, AZ (INW) with my small fuel tank. The sun was setting fast and from a bird's eye perspective, Winslow did NOT look to be a Hilton kind of town. On the ramp we found what appeared to be a fueling area but there were no commercial pumps. We were likely parked at the spot where airport designer, Charles Lindbergh, intended the early airliners to take on fuel but the decrepit equipment looked to be a casualty of the dawn of the jet age.

The idea of Sedona and all its appeal was fading with the sunlight but if we were able to get in and out of Winslow in 15 minutes, Flagstaff (FLG) was still an option, (for a Hilton anyway). Joerg spotted a self-serve fuel sign partially hidden behind a building. I grabbed my prop and dragged the Waiex 200 hundred yards at jogging pace slightly downhill and around the corner which was faster than getting in and cranking up. The credit card machine gave me fits but I otherwise got topped off in record time. Without a soul to be found on the ground or in the air we hastily departed Winslow. Climbing out flat trying to keep my cylinders cool from the quick-turn, Joerg says on the radio "look down there, the meteor crater!" The low sun lit up the rim and made a spectacular drawn-out shadow to the east. I suppose if we had actually planned this flight a bit more we would have planned to see it. As a surprise, perhaps it was even better.

Unfortunately, Joerg does not have lights on his airplane or, much of an electrical system at all for that matter. He uses a solar panel to charge an automotive battery in the nose that powers his radio, transponder, and EFIS. The battery lasts quite a while and he never ran short of juice. However, his lack of lights presented a problem at Flagstaff where the tower was still open. According to the GPS, our arrival would be five minutes short of sunset. Hmmm, that's illegal. Could he ride my lights in as a "flight of two"? I didn't want to push it. With a little bump-up in power combined with the higher groundspeeds during descent, we exited the runway at Flagstaff with two minutes to spare until sunset. Opening the canopy brought a rush of cold air. It was 45 degrees F outside. We had been sweating 30 minutes earlier. Welcome to 7000' elevation at sunset. We ended up in the hotel a bit too late and the bar was not serving food anymore. Oh well, we just racked up our second free stay so that's more money for 100LL.

Day three; the plan was to fly to Las Vegas, an easy one hour 42 minute hop to Henderson, NV (HND) south of the city. Despite being a day behind, we were happy to be rested and comfortably take in the incredible desert terrain and Grand Canyon views off our right wings. It was a nice change from the fatigue of the previous two day's six hour flights. From 65 miles out, we could clearly identify the Stratosphere, the Strip and the black Luxor pyramid. The only minor hiccup was that Henderson tower did not allow "flight of two" arrivals. That seemed odd. There must have been some type of incident prompting a memo in the Henderson tower. Luckily, Joerg was listening in and called in right behind me. Everywhere else on the trip a "flight of two" was never a problem.

Not more than an hour after landing, while in the FBO, the lady behind the desk asks if I was flying the little orange plane. "A man on the phone wants to talk with you". Uh, oh. Waiex builder Bob Rodgers had Googled me, somehow found my cell phone number, and wanted to see my plane. It turns out his shop is in a hangar facing the runway. This was surprising as there are only about 150 Waiex kits sold in the world with about 40 flying. We ended up going for a short ride before I left town. I hate the idea of a builder that has never flown in the type he/she is building!

Day four; the Las Vegas stop was a chance for a full day of rest. The Las Vegas Hilton provided the accommodations while I caught up with my best childhood friend, Tim. Joerg set up his solar panel on the ramp to top off his battery with a day and a half of pure sunshine and I took my cowl off for a mid-trip inspection and oil change in Bob's hangar. I did go flying on my "day off" taking Bob and Tim up for quick rides. About 15 miles south of Las Vegas I found a spot where there were no people, cars, boats, antennas, barns, or cows, just a dry lake bed and some 500 foot plateaus. Yes, I got low and yes, it was fun, almost like a dream. In too little time and only $20.00 gone on a Kansas City Royals loss, (I only bet on sports as it usually lasts longer) it was time to move on. The plan was to go from Las Vegas to Mojave, Catalina Island, and eventually Phoenix, AZ to see my sister all in one day. It was an overly optimistic itinerary and not surprisingly, we would come up short.

Day five; we had to scrap the plan to visit Mojave. Joerg wanted to land the Eze there for nostalgia's sake and I wanted to visit a fellow Waiex builder and give him a ride. However, the winds at Mojave were forecast to peak at 45 knots that day, maybe next time. Catalina Island was fog-free with light winds so we decided to go for it. I felt excited, yet tense, realizing that our ultimate destination and its associated

risks were just a few hours away. I had initially planned on a route from the Mojave area around the north side of LA but with Mojave out of the picture, I was relieved to see that a southern route looked much easier. Redlands, CA (REI) appeared to be the most logical fuel stop as we needed enough fuel to get to the island and back well into the mainland to avoid the hassle of a busy coastal airport. Along the route we were treated to incredible views of Big Bear Lake and the San Bernardino Mountains. I recall the engine out options as minimal with nothing but mountainous terrain and timber below. The real fun began after crossing the peaks, weaving through the canyons during descent into the Redlands area.

We spent the next hour asking the locals about the best way to get to Catalina Island Airport (AVX) through all of the congested LA airspace. We found a CFI who said the easiest way is to just call SoCal approach and they would be a great guide. He was right. They were friendly and helpful with worst part being a small vector 20 degrees off course for a few minutes. We even barely clipped the inside of the Los Angeles Class “B” airspace as we wanted a bit more altitude for the overwater part. The controller saw it coming and cleared us in without asking. Thank you SoCal Approach!

The approach to Catalina Island was the pinnacle of the trip, both geographically and psychologically. There had been obvious hesitation about the 30+ miles of open-ocean that we had to cross. Without rafts or life preservers, we figured that ditching next to one of the many boats would (hopefully) result in a short rescue. One concern was the mental picture of our airplanes at the bottom of the ocean. I still had the “new car” feeling with my Waiex. It was only a year old at the time. Disregarding the monetary part, I had spent 1880 hours and about 1206 days building the thing (Joerg invested two days picking up his Eze in Dallas!). The odds were good. My little engine, according to my GPS odometer, had pulled me nearly the equivalent of around the world once already. I was asking for it to run smoothly for a measly five minute time-span that would allow a glide to either a Los Angeles area beach or the Catalina Island Airport. While I was insured, the thought of starting over did not sit well as it would severely delay my plan to build a Pitts or, with the insurance money, give it a really good jump-start.

I had figured 8,500 feet would be an ideal altitude over the Pacific but SoCal Approach Control suggested 6,500 because of other traffic. The five minute “wet footprint” window suddenly changed to eight minutes. Oh, well. There were tons of boats below on the calm sea. I kept a very close eye on my

Dynon engine monitor that keeps tabs on every cylinder. Reaching the point of no return was obvious. “Such a small craft over so much blue”, I remember thinking. It was reassuring to look off my wingtip at Joerg. His presence meant that what I was doing was agreed on by another party and was thus perhaps not an entirely insane idea. I took note that my little Waiex had now flown over the Atlantic and Pacific oceans! Soon, we were in gliding distance of the runway at Catalina that amounts to basically a scraped-off mountaintop. Spiraling down gave us time to circle the town of Avalon and check out what’s left of the old seaplane base that once catered to the getaway desires of the Golden Age Hollywood crowd. I readied my cockpit camera to record my best YouTube video to date.

Arriving overhead the Catalina Island Airport, the “Tower” operator suggested runway 22 with wind speed of about 4 knots. I had previously read about the effect of the steep uphill slope of 22 causing a landing illusion of a short runway and yet I was still fooled. A pilot will see the entire runway until the flare at which point the far half disappears. Rolling out, the pilot will suddenly see only a few hundred feet of runway remaining. I hit the brakes a bit hard wondering how I managed to land so long. Cresting at mid-length, I went from cursing the moment to cursing myself for being deceived as another 1500 feet of available runway came into view. Clearing the runway, I could hear Joerg’s C-85 at full power behind me. The cliff leading up to the runway edge had tricked him into an abnormal glidepath so he went around.

It was a good call. An incident on this island would likely require a lengthy stay to get things right again, never mind the fact that we were the absolute greatest distance from home.

“Well, its all tailwinds from here” I said sarcastically while hopping off the wing. We had flown the past four days and 15 flight hours into prevailing westerly headwinds knowing that we were paying our groundspeed dues. We maneuvered the airplanes by hand into a taxi spot on a mostly empty ramp. Finally, we were chocked at Catalina Island’s “Airport in the Sky”, 1600 feet above the Pacific Ocean and nearly 2000 statute miles from Atlanta. It was time to get lunch and the T-shirt.

Because AVX airport is privately owned by a conservancy, donations and landing fees keep it going. After landing, the first thing to do is visit the “tower” and pay the $25.00 landing fee. I had been warned by pilots in the previous months that the runway was in bad shape and that my small wheels would be

swallowed up resulting in damage. The runway was plenty smooth and it was gratifying to knowe the fees were used for airport maintenance.

Below the tower is a restaurant and gift shop adjacent to an old hangar once used to shelter Mr. Wrigley's (gum fortune) DC-3. At one time, the Wrigley's owned the entire island. We saw the mail arrive via Cessna Caravan. The owner of the mail contract appeared to be "Catalina Flying Boats" despite their airplane having wheels instead of floats. We spent some time walking around taking in the history which is well documented with pictures and text in the restaurant. What a peaceful place, sort of like Kitty Hawk with buffalo instead of deer.

An optimist by nature, I tend to digress a bit when aviating. Little problems snowball easily so I have a tendency to keep an eye out for something to go wrong. Right on cue, I noticed fog, clouds, or something rolling over the edge of runway 4. My first thought was that we were about to get socked-in by an approaching marine layer. I have seen pictures of the top of Catalina in the clear with and everything below covered in fog. I still had one more "sort of" plan for the trip and that was to see my sister in Phoenix. The forecast was good but I know Georgia's weather, not Southern California's. I suggested to Joerg that we get moving. While I'm sure that there are far worse places to be stuck I had bleak thoughts of a days-long fog delay.

There was a short discussion about the departure as the Eze requires a relatively long takeoff roll. We debated whether it was best to takeoff uphill with a slight headwind or downhill with a tailwind. Regardless of which runway is used, one could limp off the end and gain speed during the drop to the ocean. Fortunately, the Eze handled the uphill takeoff quite well. Only after takeoff did we see that the area of clouds was localized and was not a reason to leave early. The decision was still a good one as our habit of running short of daylight continued hours later as we approached Phoenix. Circling over Catalina we decided to climb to 7500' feet before crossing the water. Upon turning eastbound we were overjoyed to be making 165 mph over the ground. We were so tired of only 115-120 mph pointing west. It was about an hour to Thermal, CA (TRM) for fuel.

I had noticed the sun was uncomfortably low as we pulled into Thermal. My familiar sense of urgency returned as we still had to fuel up and fly one and a half hours to Phoenix. We were simply trying to get too many miles out of too few hours of daylight. Rarely is a fuel stop "quick" because often someone will approach and ask the usual questions: "what's this?", "did you build it?", "how long did it take?", "how fast?", and sometimes "how much"? These questions are usually directed at Joerg with his three decades older but more interesting airframe shape. One person approached during the stop at Thermal and wanted to show us his homebuilt project located on the field. Normally, I would be happy to check out a project but given the circumstances I very politely declined while informing him of our schedule.

Eastbound from Thermal to Phoenix, Deer Valley Airport, (DVT) is a course that basically follows Interstate 10. The option of a 100 mile long emergency runway below was nice plan "B" for a while. Our plan was that if one of us went down in a remote area, the other pilot would radio for help with the coordinates. With small towns scattered in between great distances the reality of spending the night alone in the desert versus knocking on a ranchers door could vary over a ten minutes of flight time should the engine call it a day. Fortunately, the Jabiru and Continental purred along and the setting sun

at our backs lit up the reddish rocks evoking a Mars-like landscape. The pounding desert thermals of the day had finally diminished allowing a continuous hour of smooth air which was something we'd longed for since Alabama. Despite the tranquility of the flight there was a looming familiar problem; the GPS ETA showed us arriving 10 minutes after sunset. That figure kept creeping up as we lost some of our tailwind. It was time to consult the chart for an alternate.

The options didn't look good. We were over the most desolate terrain of the trip. No longer were there three, four, or five airports that were suitable without going way off course. Buckeye, AZ (BXK) was the only one. It was a shame to miss the benefit of a free hotel room and the company of my sister by coming up 15 minutes short but we had no other choice. We entered the pattern at Buckeye in beautiful sunset light, calm as can be, with a marked increase in temperature with every few hundred feet in the descent. By the time we got the covers on the aircraft, it was pitch dark and after normal business hours.

The FBO building was locked up tight but we did find a phone number. Scott, the Public Works Director, showed up about 30 minutes later in his own vehicle to take us to the hotel! Despite having to actually pay for hotel rooms with our own money ($100 for a not-so-nice room) it was a pleasant stay. We spent the remainder of the evening reviewing the pictures and videos of the trip. It was a major disappointment to find that the battery in my camera had quit during the descent into Catalina. So much for my "best video ever".

Day six; a 36 mile flight to Deer Valley Airport was the only plan of the day in order to land closer to my sister's house. Because of some special operations and airspace rules at nearby Luke Air Force Base,

the local pilots recommended a frequency to contact approach control after takeoff. The controllers were pretty busy but held our hands for the 20 minute ride to the north of Phoenix. Ending the flying day in the morning rather than sunset was a welcome change and offered lots of time to catch up with my sister, her husband, and my little nephew. It was great to be on the trip of a lifetime from an aviation perspective and yet be able to visit family and friends at the same time.

By using my airplane, I felt that I had three vacations packed into one. Unfortunately, during our stay we heard that Amanda Franklin died about ten weeks after her airshow accident. Leaving Phoenix slightly depressed, I recognized a small positive. Such news keeps us in check. One thing that I've learned from 25 years of flying is that when you're having the time of your life, watch out: vulnerability rises in proportion.

Day seven; from this point in the trip we had no other goal other than to make it back home without damage or injury and lay claim to success. Restricted and Prohibited areas scattered east of Phoenix made the direct route home impossible. The terrain and alternate airport options weren't ideal either. We could have gone north towards Albuquerque or south towards El Paso. Taking the northern route was shorter mileage-wise and was familiar from the trip westbound. Backtracking slightly, we stopped at different airports eastbound for some new scenery. We set course to Moriarty, NM (0E0) on the east side of Albuquerque.

The Moriarty Airport appeared to be home for all of the Albuquerque based glider-types with perhaps 100 glider trailers on the field. I was taxiing to the pumps with my canopy slightly open to counter the 92 degree heat when I hit felt a jolt and the Waiex swerved to the right. My first thought was I had snagged one of those tie-down cables that are so easy to trip over on some ramps, ripping off my right wheel pant. I immediately envisioned flying home with damaged wheel pants crammed in the already full baggage area. I shut down and found that I had run over a recessed tie-down ring with my tiny four inch tailwheel. Despite a reduction in the dimensions of the head of the tailwheel pivot bolt, the structure was otherwise fine. I did notice that the wheel bearings were going bad and making a terrible grinding sound. I only needed five more landings out of it to get home. I would check it again in Amarillo an hour and a half later.

With Thermal lying below sea level and Flagstaff at 7014' and temperatures ranging from the 30's to 90's, the performance of our machines was well tested but the 6200' elevation along with the high temperature at Moriarty provided the most challenging climb of the trip. The high density altitude caused Joerg to have perhaps his longest takeoff roll ever in the ground-loving Eze. In Georgia, when I reach 7,500 feet to cruise, the air is cool and my engine is happy. At Moriarty, the temperature at 7500' MSL was about 20 degrees warmer than what I'm used to and that's only 1300' AGL! The difference proved to be a major factor for overall climb performance. We often had to cruise-climb at 135 mph and 300 feet per minute instead of the usual 110 mph and 700 feet per minute to control the temperatures. When climbing out of Moriarty, only normal cruise speeds crammed enough air into our cowls to keep the cylinder and oil temperatures in the green. Multiple step-climbs were the only way to get to altitude.

We opted for Tradewind Airport (TDW), at Amarillo instead of the big airport to experience the ambiance of another unfamiliar, small American airport. We fueled up and I checked my tailwheel. It was getting

worse but still rolling. If it were the only problem left on the trip that was just fine. I could likely get one landing out of a completely locked up wheel with the ¾ inch of rubber left as a skid. We decided on Norman, OK again for the night as the transportation and hotel situation were a known element from having been there five days ago. 5.3 flying hours from Phoenix we were shutting down in Norman.

Day eight; without tornados, thunderstorms, high surface winds, or marginal VFR for the nearly the entire ride back from Catalina to Atlanta, Joerg and I savored the ride. Desert turbulence and tailwind components below 20 mph were our only reasons to gripe. While fueling up in Stuttgart, AR (SGT) a good friend living in Alabama, Steve, contacted me via Facebook and offered us lunch if we stopped by. Decatur, AL (DCU) was sort of on the way and would be the last stop before home. We took him up on his offer and he gave us a tour of some tornado damage in Huntsville from the “Tuscaloosa” storm system. As a photographer, Steve documented our stop and took a great picture of our final formation departure before home. Taxiing out, I could hear the bearings inside the tailwheel getting louder albeit exaggerated by the “megaphone” configuration of the Waiex turtledeck structure. One more landing was all I needed. A later inspection revealed that I could not turn my tailwheel by hand. It was getting close to a lockup. However, that was the only mechanical issue we had in 65 hours of combined flying. Not too bad.

A little over an hour later Joerg peeled off to the right as he had to go around the south side of Atlanta and I to the north to reach our home airports. Mountains, deserts, plains, forests, rivers, major cities, and oceans had all been safely traversed but the fast-paced schedule had left me about two days mentally behind. All of the places that my little plane had taken me had not yet sunk in and I tried to process the fulfillment of a lifelong dream. Touching down on my home runway jolted me into the familiar mindset of a typical local flight which only added to the surrealism of the moment. Opening the canopy I thought, “Was I really on Catalina Island three days ago in this airplane?”

In 2012, I completed a 17 state, 8 day trip to New England then Oshkosh. In July, 2013, I plan to fly to the Northwest USA on the way to Oshkosh. If that goes as planned, I will have made a stop in 47 of the lower states. Only Louisiana will remain and I’ll be likely to check that off by years’ end.

Some trip stats for the west coast portion of the trip….

8 days

4331 Statute Miles

33.4 - actual flight hours

129.7 - average mph

178.1 - total gallons used

$1100.53 - total fuel cost

24.32 - average miles per gallon

$6.18 - average price per gallon

5.33 - average gallons per hour

AeroVee Oil Pressure Modifications

by Michael Farley, Waiex 0056

Over the course of the summer, I spent some time performing necessary maintenance on my AeroVee 2.1 engine. As some of you know, upon my return from Oshkosh AirVenture 2013, I spent around a week completing an overhaul of my engine using parts I purchased from the Sonex factory during the big show. Aside from the basic rebuild, I also capitalized on the opportunity to increase the compression on my engine, modify the fuel system in order to eliminate any of the notorious Sonex "burps", and finally swap out the lower case mounted oil cooler in favor of the Onex style top mounted oil cooler setup.

Once I was able to get my Waiex back flying, I was very happy with the results. Not only did my airplane climb better and run faster than before, the fuel system redesign also completely eliminated those annoying little engine stumbles (or burps) that I was occasionally getting on takeoff. I was also pleased with the increase in oil pressure my freshly rebuilt engine was giving me, although I did notice some interesting oil pressure readings as I continued test flying my Waiex.

On the first test flight after the rebuild I was indicating oil pressure readings in the 55-58 psi range. If anything, almost too good! The second flight resulted in oil pressure in the 44-46 psi range and while I found it suspicious that the two different flights resulted in different oil pressures, with everything "in the green" I decided to simply monitor things for the time being. Previously I had installed an adjustable oil pressure regulator assembly onto the engine, but at this point I was not making any adjustments to the spring tension so I was at a loss as to why the pressure kept changing.

Recently, I was able to make the annual journey from central Ohio down to Crossville, TN for the American Sonex Association yearly gathering. The 2013 gathering celebrated the 10th anniversary of the gathering, and a record 40 Sonexes were in attendance. I was thrilled and honored that my own little Waiex was there, and that I could visit with old friends while making new ones. On the journey to and from Crossville, I paid special attention to my oil pressure readings and noted a few interesting trends.

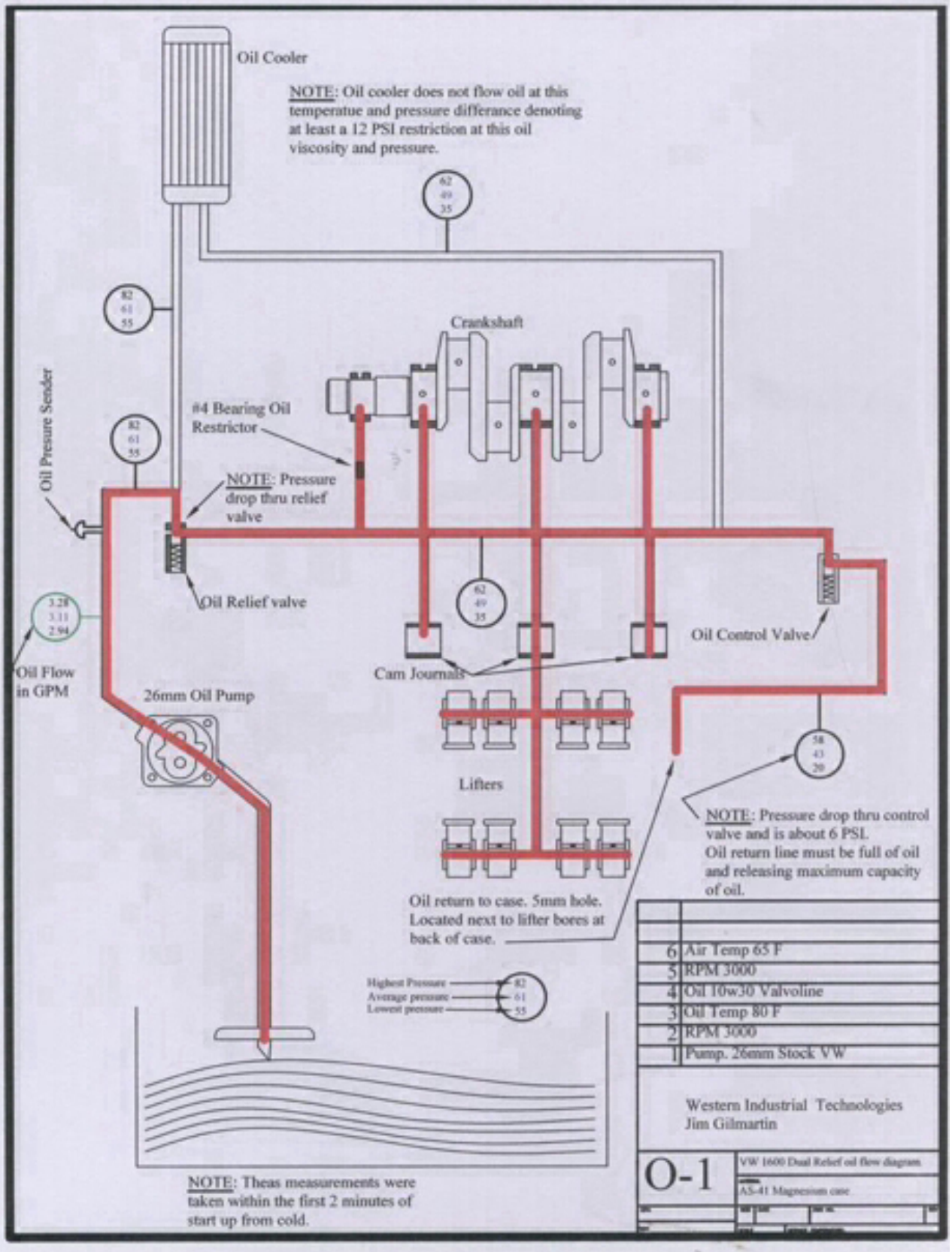
On the flight to Crossville, my oil pressure reading was constant right at 40 psi. A little low for my taste, but still what I considered to be completely safe. On the flight home the next day however, things got even more interesting. Due to the trip length and forecast headwinds I decided to make a fuel stop, making my trip home consist of two legs. During the first leg my oil pressure once again quickly stabilized right at 40 psi and held steady until I landed for fuel. After a quick refueling, I was once again headed home but this time found my oil pressure had magically increased, indicating an oil pressure of 60-62 psi! Obviously, something had changed, and while I was comfortable continuing home, I decided at that time that something just wasn't working properly inside my engine and it was time to investigate.

After doing a little research, I learned that the VW engine oil pressure is controlled by a spring loaded oil plunger found in the oil passage journey located on the flywheel side (for us, the back) of the engine. The spring tension is set so that, when the oil is cold and the pressure is high, that pressure forces the plunger down onto the spring and allows the thick oil a relief passage into the case, thus lowering pressure. After the oil warms up and thins out, the pressure drops at which point the spring tension pushes the plunger back up the oil journey, blocking that relief passage and as a result raising oil pressure. The VW engine also has a second spring loaded oil pressure relief plunger located on the propeller side of the of the block, but this plunger is essentially an oil cooler bypass plunger that has little to nothing to do with overall engine oil pressure. On the old VW Beetles and anyone with a top mounted oil cooler, this bypass plunger keeps the engine from over pressurizing the oil cooler and forcing it to rupture. In this way, it also sort of acts as a very basic oil vernatherm; very clever!

I reviewed the AeroVee engine assembly manual and noted page 13, assembly step #4 has a note which reminds the builder that "the plungers must move freely in the passages. If they do not, clean the plungers with fine emery cloth until they do." Armed with this information, I deduced that one or possibly both of my oil plungers must be sticking in their oil passages, causing my oil pressure variation. I pulled my engine cowling, drained the engine oil, and got to work removing these plungers and cleaning them up with fine sand paper and emery cloth until I could insert each plunger in its oil passage and have it fall out a few seconds later. I made sure to work slowly during this time as I did not want to open up the plunger tolerances too much and cause a pressure problem later on.

After each plunger could move freely in its passage, I ensured the plunger springs had no sharp points that could cause them to stick in the oil passages, and then reassembled the engine with the addition of fresh oil. It was time to test run the engine so I started it up and was amazed to see the oil quickly stabilize right around 52 psi. This was with a cold engine and cold oil; normally given these conditions, I would see my oil pressure rocket up to 75-85 psi, then slowly drop as the oil warmed up. Now, as the oil warmed up, the pressure stayed right at 50 psi, even when adding nearly full power for several seconds.

On the next test flight I watched in amazement as my oil pressure continued to hold a steady pressure right at 50 psi from engine start through taxi, takeoff, and cruise. Even when pulling back the power on descent and landing, the oil pressure never dropped below 40 psi until I was on a slow taxi back to the hangar. Even at that point my oil pressure continued to hold around 35 psi which is much higher than it was previously.


Oil Cooler
NOTE: Oil cooler does not flow oil at this temperatue and pressure differance denoting at least a 12 PSI restriction at this oil viscosity and pressure.
62
49
35
82
61
55
Crankshaft
#4 Bearing Oil Restrictor
Oil Presure Sender
NOTE: Pressure drop thru relief valve
Oil Relief valve
3.28
3.11
2.94
Oil Flow in GPM
Cam Journals
Oil Control Valve
26mm Oil Pump
Lifters
58
43
29
NOTE: Pressure drop thru control valve and is about 6 PSI.
Oil return line must be full of oil and releasing maximum capacity of oil.
Oil return to case. 5mm hole. Located next to lifter bores at back of case.
Highest Pressure
Average pressure
Lowest pressure
6 Air Temp 65 F
5 RPM 3000
4 Oil 10w30 Valvoline
3 Oil Temp 80 F
2 RPM 3000
1 Pump. 26mm Stock VW
Western Industrial Technologies
Jim Gilmartin
O-1
VW 1600 Dual Relief oil flow diagram
AS-41 Magnesium case
NOTE: Theas measurements were taken within the first 2 minutes of start up from cold.

In the end, I'm thrilled with the excellent oil pressure I'm now getting on my AeroVee. I can reliably count on an oil pressure right at 50 psi in cruise with no massive pressure surge on engine start or takeoff. To summarize, here is a list of changes I made to my oil system:

1. Removed the lower crankcase mounted oil cooler and add the Onex style top mounted oil cooler and associated hardware, including a new oil pump with no external oil line taps. While there was nothing wrong with the original setup, I like the fact I have no oil lines on my engine. I never liked the constant flexing of the oil lines every time I changed my oil.

2. Sanded and cleaned both oil pressure plungers to the point they both move freely in their oil passages. This is very important!!

3. Added an adjustable oil pressure regulator assembly onto the main oil pressure control plunger in order to better control overall engine oil pressure. While I haven't actually increased the spring tension over the original setting, I like having that control authority.

4. Added a mechanical oil pressure gauge for accurate readings. I bought one from the local auto parts store for around $20, and it's much more accurate than the digital oil pressure sender readings through my MGL screen. I've tried at least 5 different oil pressure senders and each gives a different reading. Had I known, I would have found a spot in my panel from the beginning for this very important gauge! Having no other options, I mounted the mechanical oil pressure gauge below my panel.

If any of you are having oil pressure issues, I highly recommend you take a little time to ensure those oil pressure plungers can move freely. It solved all my problems!